

Mullard tubes and special products

quick reference and equivalents guide 1972-73



Also available,
companion guides
covering
semiconductors
and
passive components



contents

Page
No.

4 Index

Receiving Valves

- 19 R.F. pentodes
- 19 Diodes and double diodes
- 19 Triode
- 20 Double triodes
- 20 Triode pentodes and double pentode
- 21 Power pentodes
- 21 High voltage diodes
- 21 Voltage indicator tube
- 21 Electrometer valves

Picture Tubes

- 22 Colour picture tubes.
- 22 Monochrome picture tubes

Electro-optical Devices

- 23 Screen phosphors
- 24 Oscilloscope tubes
- 25 Television monitor tubes
- 25 Data display tubes
- 25 Flying spot scanner tubes
- 25 Projection tubes
- 26 Camera tubes
- 28 Image intensifier tubes
- 28 Image converter tubes

Photosensitive Devices†

- 29 Cadmium sulphide photoconductive cells
- 30 Photomultipliers
- 32 Photoemissive tubes
- 32 Photoemissive tubes for photometry

Cold Cathode Devices

- 33 Voltage reference tubes
- 33 Voltage stabiliser tubes
- 33 Switching diodes
- 34 Indicating tubes
- 35 Pandicon multiple indicator tubes
- 35 Counting tubes
- 35 Trigger tubes

Power Devices

- 36 Ignitrons for welding applications
- 36 Inert gas thyratrons
- 37 High voltage half-wave rectifiers
- 37 Mercury vapour triode thyratrons

Page
No.

Transmitting Tubes

- 38 Triodes for industrial heating
- 40 S.S.B. tetrodes
- 41 Telecommunications power tetrodes
- 42 Double tetrodes
- 42 Triodes for television translator service
- 43 Telecommunications power triodes

Microwave Tubes

- 44 Heating magnetrons
- 44 Low power tunable magnetrons
- 45 High power radar magnetrons
- 45 Spin tuned magnetrons
- 46 Marine radar magnetrons
- 47 Beacon and special purpose magnetrons
- 48 Airborne radar magnetrons
- 48 Radar travelling wave tubes
- 49 Communications travelling wave tubes
- 50 Low power klystrons
- 51 U.H.F. high power klystrons
- 51 S-band high power klystrons

Microwave Solid State

- 52 Germanium tunnel diodes
- 52 Microwave mixer diodes
- 53 Microwave detector diodes
- 53 Varactor diodes
- 54 Gunn effect devices
- 54 Solid state sources
- 54 Mixers
- 55 Parametric amplifiers
- 55 Ferrite components—circulators and isolators

Particle and Radiation Detectors

- 56 Channel electron multipliers
- 56 Channel electron multiplier plates
- 57 Geiger-Müller tubes

Vacuum Products

- 59 Ionisation gauges
- 59 Appendage vacuum pumps

60 Dry Reed Switch

† Abridged data on phototransistors, photodiodes and infrared photoconductive detectors appear in a companion guide called "Semiconductor Quick Reference Guide".

Tubes and special products

quick reference and equivalents guide 1972/73

This guide presents quick reference data on the Design and Current ranges of Mullard tubes and special products, together with a guide to the valves and tubes for which Mullard types may be used as replacements.

Product information is deliberately abbreviated to give a rapid appreciation of salient characteristics, and to enable the performance of similar types to be compared quickly.

Full technical data on individual products, and details of the Mullard Technical Handbook, may be obtained from Mullard Ltd.

For the convenience of Handbook users, the relevant book and part number are indicated at the top of each data table in the guide ; data sheets for some new types may still be in preparation.

Mullard technical information service

Quick reference information

The most important characteristics of the current ranges of Mullard valves, tubes and special products are given in this guide.

Full technical data

Individual data sheets giving full technical data on each product are readily available, and may be obtained by quoting the relevant type number. In addition, laboratory reports, applications reports and technical publications of many kinds are regularly issued.

Technical Handbook system

The Mullard Technical Handbook system of data is made up of three sets of books, each comprising several parts.

The three sets of books, easily identifiable by the colours of their covers, are as follows :

Book 1	(blue)	Semiconductor devices and integrated circuits
Book 2	(orange)	Valves and tubes
Book 3	(green)	Passive components and materials

New editions are issued at approximately yearly intervals.

New product information

As a further part of the information service, advance details of each new product or technique are published in the Mullard Bulletin, which is sent automatically to people who have asked to be kept informed of new introductions.

Index and equivalents

Foreword

This section presents an index of all Mullard Valves and Tubes, together with a comprehensive guide to various valves and tubes for which Mullard types may be used as replacements.

For ease of reference all types are listed together in alphabetical-numerical order in the 'Type Number Index' column which comprises Mullard types, CV types, American/E.I.A. types, and types from other manufacturers.

status code

In view of the wide variety of Mullard types, and in order that their status may be readily assessed, the following coding has been used :

- D** Design Type. Recommended for new equipment designs.
- C** Current Type. Available for equipment production and use in existing equipment installations. No longer recommended for new equipment designs.
- M** Maintenance Type. Available for the maintenance of existing equipments only. No longer recommended for equipment production.

- O** Obsolete Type. No longer generally available, although in some cases limited stocks may still exist.
- S** Special Type. Subject to negotiation at time of ordering.

A28-14W

to

C1112

Index and equivalents

Type number index	Mullard replacements	Data Page	Type number index	Mullard replacements	Data Page	Type number index	Mullard replacements	Data Page
	Mullard type number	Status		Mullard type number	Status		Mullard type number	Status
A28-14W	A28-14W	M	AG866A	RG3-250A	C	BAW95G	BAW95G	D
A31-120W	A31-120W	D	AG5209	†85A2	D	BAY66	BAY66	M
A44-120W	A44-120W	D	AG5210	†108C1	D	BAY96	BAY96	D
A44-120W/R	A44-120W/R	D	AG5211	†150C2	D	BK24	ZX1052	C
A47-11W	A47-26W	M	AH201	RG3-250A	C	BK24B	ZX1052	C
A47-13W	A47-26W/inckit	M	AH221	RG4-1250	C	BK24C	ZX1052	C
A47-14W	A47-14W	M	AH238	RG3-1250	C	BK34	ZX1053	C
A47-15W	A47-14W	M	AN1	AN1	O	BK34B	ZX1053	C
A47-17W	A47-26W	M	AR10	ZX1052	C	BK42	ZX1051	C
A47-18W	A47-26W	M	AR10T	ZX1052	C	BK42B	ZX1051	C
A47-25W	A47-26W	M	AR14	ZX1051	C	BK42C	ZX1051	C
A47-26W	A47-26W	M	AR14T	ZX1051	C	BK46	5555	O
A47-26W/R	A47-26W/R	M	ASG5121	†EN91	D	BK146	ZX1053	C
A47-27W	A47-26W	M	ASG5823	Z900T	C	BK146B	ZX1053	C
A47-28W	A47-26W	M	AW43-88	AW43-88	O	BK168B	ZX1061	C
A47-28W/R	A47-26W/R	M	AW43-89	AW43-89	O	BLM167	YJ1410	D
A49-11X	A49-120X	C	AW47-90	A47-14W	M	BM1002	JP9-15B	D
A49-15X	A49-120X	C	AW47-91	A47-14W	M	BM1048	YJ1110	D
A49-18X	A49-120X	C	AW53-88	AW53-88	O	BM1049	2J42	D
A49-191X	A49-120X	C	AW59-90	A59-15W	M		†BR191	C
A49-120X	A49-120X	C	AW59-91	A59-15W	M	BR191B	TY6-5000A	C
A49-200X	A49-120X	C	AX224	RR3-250	C		TY6-5000B	M
A50-120W	A50-120W	D	AX228	RR3-1250A	C		YD1120	
A50-120W/R	A50-120W/R	D	AX230	RR3-1250	C	BT5	XG1-2500	C
A56-120X	A56-120X	D	AX9900	TY2-125	C	*BT17	XG2-6400	C
A59-11W	A59-23W	M	AX9901	TY4-400	C	BT19	XG2-500	O
A59-12W	A59-23W	M	AX9902	TY4-500	D	BT69	XG15-12	O
A59-13W	A59-23W/inckit	M	AX9903	QQV06-40A	C	*BT77	XR1-6400A	C
A59-14W	A59-23W/inckit	M	AX9904	TY6-5000W	C	BT77A	XR1-6400A	C
A59-15W	A59-15W	M	AX9904R	TY6-5000A	C	*BT79	XH3-045	O
A59-16W	A59-23W/inckit	M	AX9906	TY12-50W	M	BT83	XH16-200	O
A59-23W	A59-23W	M	AX9907	QY5-3000W	C	BT85	XH8-100	O
A59-23W/R	A59-23W/R	M	AX9907R	QY5-3000A	C	*BT91	XR1-3200A	C
A59-25W	A59-23W	M	AX9908	QY5-5000	D	BT91A	XR1-3200A	C
A61-120W	A61-120W	D	AX9910	QQV03-20A	C	*BT109	XR1-6400A	C
A61-120W/R	A61-120W/R	D	AX9911	XH8-100	O	BT111	ZT1011/	C
A63-11X	A63-120X	M	AX9912	XH16-200	O		XR1-1600A	
A63-120X	A63-120X	M	B109	UCC85	O	BXY27	BXY27	D
A63-200X	A63-120X	M	B152	†ECC81	C	BXY28	BXY28	D
A65-11W	A65-11W	M	B309	†ECC81	C	BXY29	BXY29	D
A66-120X	A66-120X	D	B310AL	B310AL	D	BXY32	BXY32	D
*A206	RY12-100	O	B310BL	B310BL	D	BXY35	BXY35	D
*A1834	6080	C	B312AL	B312AL	D	BXY36	BXY36	D
A2327	TD03-10F	M	B312BL	B312BL	D	BXY37	BXY37	D
AAY34	AAY34	D	B318AL	B318AL	D	BXY38	BXY38	D
AAY39	AAY39	D	B318BL	B318BL	D	BXY39	BXY39	D
AAY39A	AAY39A	D	B319	PCC84	M	BXY40	BXY40	D
AAY50	AAY50	C	B329	†ECC82	C	BXY41	BXY41	D
AAY50R	AAY50R	C	B330AL	B330AL	D	*C3J	ZT1011/	C
AAY51	AAY51	D	B330BL	B330BL	D	C3JA	XR1-1600A	
AAY51R	AAY51R	D	B339	†ECC83	C	*C6J	XR1-6400A	C
AAY52	AAY52	D	B410AL	B410AL	D	C6L	XR1-6400A	C
AAY52R	AAY52R	D	B410BL	B410BL	D	C17/7A	AW43-88	O
AAY56	AAY56	C	B419AL	B419AL	D	C17AA	AW43-88	O
AAY56R	AAY56R	C	B419BL	B419BL	D	C19/7A	A47-14W	M
AAY59	AAY59	D	*B593	55335	D	C19/10A	A47-14W	M
ACS4	QY5-3000A	C	B719	ECC85	M	C19/10AP	A47-26W/inckit	M
ACT70	TY6-5000B	M	B1135	TY4-400	C	C19AK	A47-14W	M
AEY13	YD1120	C	B1152	TY5-500	D	C21/7A	AW53-88	O
AEY15	AEY13	C	*B5031	ZM1020	C	C21AA	AW53-88	O
AEY16	AEY15	C	BAV22	BAV22	D	C23/7A	A59-15W	M
AEY17	AEY16	C	BAV22R	BAV22R	D	C23/10A	A59-15W	M
AEY29	AEY17	D	BAV46	BAV46	D	C23/10AP	A59-23W/inckit	M
AEY29R	AEY29	D	BAV75	BAV75	D	C23AK	A59-15W	M
AEY31	AEY29R	D	BAW95D	BAW95D	D	C23AKT	A59-23W/inckit	M
AEY31A	AEY31	D	BAW95E	BAW95E	D	C143	QY2-100	M
	AEY31A	D	BAW95F	BAW95F	D	C178A	QQV06-40A	C
						C1108	QY3-125	D
						C1112	QY4-250	D

*Replacements shown are near equivalents only.

†This is a Special Quality type. †There is a Special Quality version of this type.
electrical characteristics but not necessarily identical assessment specification.

*Replacements shown have identical

Index and equivalents—continued

Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page
	Mullard type number	Status			Mullard type number	Status			Mullard type number	Status	
C1134	QQV03-20A	C	42	CME2501	A65-11W	M		CV1866	JP9-7D	D	46
C1136	QY4-400	D	40, 41	CMG22	52CG	M		CV1889	TYSA-500	O	
CAG29	90AG	D	32	CMG29	90CG	D	32	CV1905	QY3-65	C	41
CAV29	90AV	D	32	CMV29	90CV	D	32	CV1924	TY2-125	C	39, 43
CAY10	CAY10	C	53	CR1100	QY5-3000A	C	40, 41	CV1959	HL92	O	
CAY17	CAY17	D	52, 53	CS10B	GEM3	C	52	CV1976	MV6-5	O	
CCa	§E88CC	C	20	CS10BR	GEM4	C	52	CV1992	Z300T	M	
*CE306	XR1-6400A	C	36	*CST1-6000	XG2-6400	C	37	CV2127	EL821	C	
CE309	XG5-500	M		*CT1-2500	XG1-2500	C	37	CV2128	ECH81	M	
CEM4010	B330AL	D	56	*CT1-5000	XG2-6400	C	37	CV2129	†QV03-12	C	41
	B330BL			*CT1-6000	XG2-6400	C	37	CV2130	QY3-125	D	41
	B318AL	D	56	*CV5	RG4-1250	C	37	CV2131	QY4-250	D	40, 41
*CEM4013	B318BL			CV26	QY2-100	M		CV2132	90AV	D	32
*CEM4028	B419AL	D	56	CV32	RG3-250A	C	37	CV2133	90CG	D	32
	B419BL			CV131	†EF92	C	19	CV2134	90CV	D	32
	52CG	O		CV136	†EL91	M		CV2154	SIM2	C	52
*CG8	58CG	M		CV138	†EF91	C	19	CV2155	SIM5	C	52
*CG9	58CG			CV140	†EB91	C	19	*CV2175	DG7-5	M	
*CK571AX	CV2348	D	21	*CV152	RG4-1250	C	37	CV2191	DG13-2	O	
*CK5886	CV2348	D	21	CV216	150C3	O		CV2204	TD03-10F	M	
*CK5889	CV2348	D	21	CV273	TD03-10	M		*CV2210	XR1-3200A	C	36
CL5091	CL5091	D	55	CV283	†6AL5	M		*CV2215	XR1-6400A	C	36
CL5171	CL5171	D	55	CV284	75B1	O		CV2225	†150B2	D	33
CL5181	CL5181	D	55	CV286	95A1	O		CV2235	†EY84	C	
CL5191	CL5191	D	55	CV287	150B3	O		CV2238	DL620	O	
CL5251	CL5251	D	55	CV309	QV04-7	O		CV2240	DL98	O	
CL6001	CL6001	D	55	CV354	TD03-5	M		CV2253	EN32	D	36
CL6201	CL6201	D	55	CV370	JP9-7A	D	46	CV2254	DF60	O	
CL6251	CL6251	D	55	*CV372	XH3-045	O		CV2269	CV2269	C	
CL7330	CL7330	D	54	CV417	†EC91	M		CV2270	90AG	D	32
CL7331	CL7331	D	54	*CV424	QQV06-40A	C	42	CV2271	Z303C	O	
CL7332	CL7332	D	54	CV426	EY51	M		*CV2281	YJ1070	S	48
CL8300	CL8300	D	54	CV431	85A1	M		CV2284	4J50	S	45
CL8310	CL8310	D	54	CV432	CV432	D	21	CV2302	DH3-91	D	24
CL8360	CL8360	D	54	CV449	†85A2	D	33	CV2325	Z502S	O	
CL8370	CL8370	D	54	CV455	†ECC81	C	20	CV2348	CV2348	D	21
CL8380	CL8380	D	54	CV474	EN70	O		CV2373	JP9-180	D	45
CL8390	CL8390	D	54	CV491	†ECC82	C	20	CV2382	EL822	C	
CL8430	CL8430	D	54	CV492	†ECC83	C	20	CV2387	CV2387	S	
CL8441	CL8441	D	54	CV495	CV495	D	21	CV2391	SIM8	M	
CL8450	CL8450	D	54	CV635	TY4-350	M		CV2392	SIM9	M	
CL8460	CL8460	D	54	CV722	725A	D	46	CV2395	TD03-10	M	
CL8470	CL8470	D	54	CV753	DA90	O		CV2399	RR3-1250A	C	37
CL8630	CL8630	D	54	CV797	†EN91	D	36	CV2411	CV2411	S	
CL9010	CL9010	D	55	CV850	†EF95	C	19	CV2420	JPT9-01	S	44
CL9011	CL9011	D	55	CV858	†ECC91	M		CV2421	JPT9-02	S	44
CL9012	CL9012	D	55	CV918	12K7GT	O		CV2424	JP9-250E	S	45
CL9070	CL9070	D	55	CV925	12SN7GT	O		CV2425	JP9-250D	S	45
CME1706	AW43-88	O		CV1072	RG1-240A	C	37	CV2426	JP9-250B	S	45
CME1713R	A44-120W/R	D	22	CV1128	AN1	O		CV2427	JP9-250C	S	45
CME1902	A47-14W	M		CV1144	XG2-500	O		CV2431	CV2431	O	
CME1903	A47-14W	M		CV1351	TY4-500	D	39, 43	CV2434	Z803U	C	35
CME1905	A47-26W	M		CV1355	RG4-1250	C	37	CV2463	CV2463	S	
CME1906	A47-26W/inckit	M		CV1375	EF85	M		CV2466	QQV02-6	C	42
CME1907	A47-26W	M		CV1376	EF80	C	19	CV2469	CV2469	S	
CME1908	A47-14W	M		CV1377	GZ34	M		CV2473	JP9-250F	S	45
CME1913	A47-26W	M		CV1435	RG4-1250	C	37	*CV2487	QV2-250C	D	40, 41
CME1913R	A47-26W/R	M		CV1535	EZ80	M		CV2492	§E88CC	C	20
CME1913S	A47-26W	M		CV1625	RG3-250	C	37	CV2493	§E88CC/01	C	20
CME2013R	A50-120W/R	D	22	CV1626	RG1-240A	C	37	CV2518	RR3-1250	C	37
CME2302	A59-15W	M		CV1629	RG3-1250	C	37	CV2519	QV1-150A	M	
CME2303	A59-15W	M		CV1737	MW6-2	O		CV2520	XH16-200	O	
CME2305	A59-23W	M		CV1741	EL34	M		CV2522	†6AS6	C	19
CME2306	A59-23W/inckit	M		CV1787	XH8-100	O		CV2524	6AU6	O	
CME2308	A59-15W	M		CV1795	723A/B	D	50	CV2573	5651	D	
CME2312	A59-23W	M		CV1832	†150C2	D	33	CV2666	QQV07-40	O	
CME2313R	A59-23W/R	M		CV1833	†108C1	D	33	CV2721	EL81	M	
CME2313S	A59-23W	M		CV1835	RR3-250	C	37	CV2729	§E80F	M	
CME2413R	A61-120W/R	D	22								

*Replacements shown are near equivalents only.

§This is a Special Quality type. †There is a Special Quality version of this type. electrical characteristics but not necessarily identical assessment specification.

‡Replacements shown have identical

Index and equivalents—continued

Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page
	Mullard type number	Status			Mullard type number	Status			Mullard type number	Status	
CV2730	CV2730	D	21	CV5077	PL81	M		CV6087	LA9-3B	D	48
CV2738	RG1-240A	C	37	CV5080	EF37A	M		CV6094	DM160	C	21
CV2792	2K25	D		CV5094	EL86	M		*CV6099	6929	D	28
CV2797	QQV06-40A	C	42	CV5106	E1T	M		CV6108	YJ1070	S	48
CV2798	QQV03-10	C	42	CV5120	20CV	O		CV6114	JPT9-02E	C	44
CV2799	QQV03-20A	C	42	CV5122	Z900T	C	35	CV6122	QY3-65	C	41
CV2876	§M8204	D	36	CV5123	JP9-15D	D	46	CV6123	QZ06-20	M	
CV2896	52CG	O		*CV5125	DP13-34	O		*CV6151	6914	O	
*CV2901	EF86	M		CV5132	§M8163	D	33	CV6183	YH1060	D	48
CV2957	XG5-500	M		CV5134	2J51A	D	47	CV6188	CV6188	S	
CV2966	EY86/87	M		CV5140	EA52	C	19	CV6189	CV6189	S	
CV2967	RY12-100	O		CV5157	DP13-2	O		CV6195	YK1046	D	50
CV2975	EL84	M		CV5171	DP7-5	M		CV6199	YJ1050	D	48
CV2984	6080	C		CV5173	†90C1	D	33	CV6214	YJ1090	S	44
†CV3508	§M8162	C	20	†CV5183	§M8080	C		CV6215	YJ1100	S	44
CV3512	EN92	C	36	*CV5186	§M8098	C	33	CV6223	LB3-250B	D	48
CV3521	XH25-500	O		*CV5188	§E182CC	C		CV6225	YJ1030	S	44
CV3522	QY5-500	D	40, 41	†CV5189	§M8212	C		CV6234	YJ1380	D	47
CV3523	QV06-20	C	40, 41	†CV5212	M8162	C	20	CV6248	YJ1410	D	44
CV3526	EL85	O		CV5215	ECF80	C	20	CV7108	GEM3	C	52
*CV3528	YJ1110	D	46	†CV5216	§M8100	C	19	CV7109	GEM4	C	52
CV3602	5J26	D	45	CV5219	QY5-3000A	C	40, 41	CV7762	AAV39	D	52
CV3611	5586	D	45	†CV5231	§E88CC	C	20	CV7771	AAV56	C	
CV3670	RG4-1000	O		CV5234	ZT1011/	C	36	CV7772	AAV56R	C	
CV3676	2J42	D	46		XR1-1600A			CV7776	AAV51	D	52
CV3926	TY6-5000A	C	43	CV5239	TY7-6000A	C	39, 43	CV7777	AAV51R	D	52
CV3927	12K8GT	O		CV5247	XH8-100	O			AAV51		
CV3933	§M8190	O		CV5269	DG7-6	M		CV7778	AAV51R	D	52
*CV3946	DG7-36	O		CV5274	MG6-2	O			Matched pair		
CV3953	4J78	S	45	CV5277	ET51	M		CV7838	AAV50	C	52
CV3960	§M8190	O		CV5278	ZM1020	C	34	CV7839	AAV50R	C	52
CV3997	YJ1110	D	46	CV5291	Z503M	O		CV8144	CV8144	D	21
CV3998	§E180F	D	19	CV5304	§6463	O		CV8269	JPT9-01D	C	44
CV4003	§M8136	C	20	CV5311	§M8248	S		CV8330	DG7-31	D	24
CV4004	§M8137	C	20	CV5331	ECC189	M		CV8479	TY4-400	C	39 43
CV4007	§M8212	C		CV5354	§E188CC	C		*CV8505	YJ1040	S	48
CV4010	§M8100	C	19	CV5358	ECC88	C	20	CV8652	YJ1010	D	47
CV4011	§M8196	C	19	CV5377	CV5377	S			TY6-5000B		
CV4014	§M8083	C	19	CV5397	EC157	M		CV8730	YD1120	M	
CV4015	§M8161	C	19	CV5412	DM160	C	21	CV8884	DH7-11	D	24
CV4018	§M8204	D	36	CV5418	CV5418	O		CV8959	DG7-32	D	24
CV4020	§M8223	D	33	CV5434	EM84	M		CV9155	§E88C	M	
CV4024	§M8162	C	20	CV5443	JPG9-02C	S	44	CV9334	KS9-20B	D	50
CV4025	§M8079	C	19	CV5458	TD03-10E	M		CV9424	YJ1200	D	48
CV4028	§M8224	D	33	CV5472	§E88CC	C	20	CV9509	DP7-11	D	24
CV4031	§M8031	C		CV5473	QQV02-6	C	42	CV9640	Q13-110BA	D	24
CV4039	§M8096	M		CV5766	§E182CC	C		CV10758	JP9-2-5E	D	46
CV4044	§M8091	C		*CV5793	DN13-34	O		CW1100	QY5-3000W	C	40, 41
CV4048	§M8098	C	33	CV5808	§E55L	C	21	CX1120	XH16-200	O	
CV4054	§M8142	S		CV5809	§E810F	C	19, 21	CXY10	CXY10	D	53
CV4058	§M8080	C		CV5810	EF184	C	19	CXY11A	CXY11A	D	54
CV4059	§M8097	O		CV5820	Z700U	O		CXY11B	CXY11B	D	54
CV4063	§M8082	C		CV5830	EL360	M		CXY11C	CXY11C	D	54
CV4066	§M8190	O		CV5831	EF183	C	19	CXY12	CXY12	D	53
CV4070	§M8099	O		CV5847	QQV07-50	C	42	CXY14A	CXY14A	D	54
CV4076	§M8179	S		CV5900	KS7-85A	D	50	CXY14B	CXY14B	D	54
CV4080	§M8225	D	33	†CV5937	QQV06-40A	C	42	CXY14C	CXY14C	D	54
CV4100	§CV4100	D		†CV5938	QQV03-20A	C	42	CXY19	CXY19	D	54
CV4101	§CV4101	D		CV5956	TD03-10	M		CXY20	CXY20	D	54
CV4104	§M8163	D	33	CV5957	XR1-12A	O		D2M9	†6AL5	M	
CV4108	§CV4108	S		CV5959	QY4-400	D	40, 41	D3a	D3a	S	
CV4122	CV4122	S		CV5961	CV5961	S		D7-190GH	D7-190GH	D	24
CV5018	4J52A	D	47	CV5962	TD03-10D	M		D10-11GH	D10-11GH	O	
CV5027	XG1-2500	C	37	CV5989	§E80CC	C		D10-11GP	D10-11GP	O	
*CV5035	DG13-34	O		CV6007	XH3-045	O		D10-12GH	D10-12GH	O	
CV5055	EM81	O		CV6015	CV6015	S		D10-12GP	D10-12GP	O	
CV5065	ECF82	M		*CV6044	Z303C	O		D10-160GH	D10-160GH	D	24
CV5072	EZ81	M		CV6072	JP8-02B	C	47	D10-170GH	D10-170GH	D	24

*Replacements shown are near equivalents only.

§This is a Special Quality type.

†There is a Special Quality version of this type.

‡Replacements shown have identical electrical characteristics but not necessarily identical assessment specification.

Index and equivalents—continued

Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page
	Mullard type number	Status			Mullard type number	Status			Mullard type number	Status	
D13-16BE	D13-16BE	O		DM160	DM160	C	21	E2157	†ECC81	C	20
D13-16GH	D13-16GH	O		DN7-11	DN7-11	M		E2163	†ECC82	C	20
D13-16GP	D13-16GP	O		DN7-78	DN7-78	M		E2164	†ECC83	C	20
D13-19GP	D13-19GP	O		DN13-34	DN13-34	O		EA52	EA52	C	19
D13-21GH	D13-21GH	O		DP61	†EF95	C	19	EA91	†6AL5	M	
D13-23GH	D13-23GH	O		DP7-5	DP7-5	M		†EAA901S	§M8212	C	
D13-24BE	D13-24BE	O		DP7-6	DP7-6	M		EABC80	EABC80	O	
D13-26GH	D13-26GH	O		DP7-11	DP7-11	D	24	EB91	†EB91	C	19
D13-26GM	D13-26GM	O		DP7-78	DP7-78	M		EBC81	EBC81	O	
D13-26GP	D13-26GP	O		DP10-78	DP10-78	O		EBC90	EBC90	O	
D13-27GH	D13-27GH	M		DP13-2	DP13-2	O		EBF80	EBF80	M	
D13-27GM	D13-27GM	M		DP13-34	DP13-34	O		EBF83	EBF83	O	
D13-450GH/01	D13-450GH/01	D	24	DQ2a	RG3-250	C	37	EBF89	EBF89	M	
D13-480GH	D13-480GH	D	24	DQ4a	RG4-1000	O		*EBF171	EBF80	M	
D13-500GH/01	D13-500GH/01	D	24	*DX2	RR3-250	C	37	*EBF175	EBF89	M	
D14-120GH	D14-120GH	D	24	DX151	YK1010	D	50	EC55	TD03-10G	M	
D14-121GH	D14-121GH	D	24	DX155	7093	D	47	*EC56	EC157	M	
D14-160GH/09	D14-160GH/09	D	24	DX184	55335	D	50	*EC57	EC157	M	
D77	†EB91	C	19	DX206	DX206	C	44	EC86	†EC86	M	
D152	†6AL5	M		DX267	DX267	D		EC88	†EC88	M	
DB7-11	DB7-11	O		DX285	YJ1180	D	45	EC91	†EC91	M	
DB7-36	DB7-36	O		DX290	YJ1320	D	45	EC98	†EC98	O	
DB7-78	DB7-78	O		DY51	DY51	O		*EC156	EC157	M	
DCG1-250	RG1-250	M		DY86/87	DY86/87	C		EC157	EC157	M	
DCG1-5-250	RG1-240A	C	37	DY802	DY802	C	21	EC1000	EC1000	O	
DCG4-1000ED	RG3-250	C	37	E1T	E1T	M		EC8010	EC8010	M	
DCG4-1000G	RG3-250A	C	37	E10-12BE	E10-12BE	M		ECC81	†ECC81	C	20
*DCG4-5000	RG3-1250	C	37	E10-12GH	E10-12GH	M		ECC82	†ECC82	C	20
DCG5-5000EG	RG4-1000	O		E10-12GM	E10-12GM	M		ECC83	†ECC83	C	20
DCG6-18	RG4-3000	C	37	E10-12GP	E10-12GP	M		ECC84	ECC84	M	
DCG7-100B	XG15-10	O		E10-130BE	E10-130BE	M		ECC85	ECC85	M	
DCX4-1000	RR3-250	C	37	E10-130GH	E10-130GH	M		ECC86	ECC86	M	
DCX4-5000	RR3-1250	C	37	E10-130GM	E10-130GM	M		ECC88	†ECC88	C	20
DD6	†EB91	C	19	E10-130GP	E10-130GP	M		ECC89	ECC89	O	
DDM14	DDM14	D	35	E55L	§E55L	C	21	ECC91	†ECC91	M	
DET22	TD03-10	M		E80CC	§E80CC	C		*ECC186	†ECC82	C	20
DET22D	TD03-10D	M		E80CF	§E80CF	M		ECC189	ECC189	M	
DET22E	TD03-10E	M		E80F	§E80F	C		ECC230	6080	C	
DET22G	TD03-10G	M		E80L	§E80L	C		*ECC282	†ECC82	C	20
DET23	TD03-5	M		†E81CC	§M8162	C	20	†ECC801S	§M8162	C	20
*DET29	EC157	M		E81L	§E81L	C		†ECC802S	§M8136	C	20
DF60	DF60	O		†E82CC	§M8136	C	20	†ECC803S	§M8137	C	20
DF62	DF62	O		†E83CC	§M8137	C	20	ECC804	6/30L2/ECC804	M	
DF63	DF63	O		E83F	§E83F	C		ECC2000	§ECC2000	M	
DF652	DF62	O		E84L	E84L	M		ECF80	ECF80	C	20
*DF703	CV2348	D	21	E86C	§E86C	O		ECF82	ECF82	M	
DG7-5	DG7-5	M		E88C	§E88C	M		ECF86	ECF86	O	
DG7-6	DG7-6	M		E88CC	§E88CC	C	20	ECF806	ECF806	O	
DG7-31	DG7-31	D	24	E88CC/01	§E88CC/01	C	20	ECH41	ECH41	O	
DG7-31/01	DG7-31	D	24	E90CC	§E90CC	C		ECH81	ECH81	M	
DG7-32	DG7-32	D	24	†E91AA	§M8212	C		ECH83	ECH83	M	
DG7-32/01	DG7-32	D	24	E91N	§M8204	D	36	ECH84	ECH84	M	
DG7-36	DG7-36	O		E92CC	§E92CC	M		ECL80	ECL80	M	
DG13-2	DG13-2	O		E95F	§M8100	C	19	ECL82	ECL82	M	
DG13-34	DG13-34	O		E130L	§E130L	C		ECL83	ECL83	M	
DH3-91	DH3-91	D	24	E180CC	§E180CC	C		ECL86	ECL86	M	
DH7-11	DH7-11	D	24	E180F	§E180F	C	19	EE17	XG5-500	M	
DH7-78	DH7-78	M		E182CC	§E182CC	C		EF36	EF37A	M	
DH10-78	DH10-78	O		E186F	§E186F	C		EF37	EF37A	M	
DH77	EBC90	O		E188CC	§E188CC	C		EF37A	EF37A	M	
DH109	UABC80	M		*E236L	EL360	M		EF80	EF80	C	19
DH119	UBC81	O		E250	QY4-250	D	40, 41	EF83	EF83	M	
DH719	EABC80	O		E280F	§E280F	C		EF85	EF85	M	
DK40	DK40	O		E288CC	§E288CC	C		EF86	EF86	M	
DL98	DL98	O		E810F	§E810F	C	19, 21	EF89	EF89	M	
DL620	DL620	O		E1955	†EN91	D	36	EF91	†EF91	C	19
DM70	DM70	M		E2016	†EF92	C	19	EF92	†EF92	C	19
*DM71	DM70	M		*E2134	EL86	M		EF95	†EF95	C	19

*Replacements shown are near equivalents only.

§This is a Special Quality type. †There is a Special Quality version of this type. ‡Replacements shown have identical electrical characteristics but not necessarily identical assessment specification.

Index and equivalents—continued

Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page
	Mullard type number	Status			Mullard type number	Status			Mullard type number	Status	
EF98	EF98	M		FG57	XG1-2500	C	37	IOG-18	IOG-18	D	59
EF183	EF183	C	19	FG105	XGQ2-6400	O		IOG-18N	IOG-18N	D	59
EF184	EF184	C	19	FX219	XH16-200	O		IOG-20N	IOG-20N	D	59
*EF800	§EF83F	C		FX225	XH8-100	O		IOG-71	IOG-71	D	59
*EF804	EF86	M		FX227	XH3-045	O		JNT1-500	5J26	D	45
*EF804S	EF86	M		FX229	XH25-500	O		JP2-0-2	7090	D	44
*EF805S	EF85	M		FX231	XH16-200	O		JP2-1A	DX206	C	44
*EF806S	EF86	M		FZ9011G	90AG	D	32	JP2-2-5A	YJ1162	D	44
*EF811	EF183	C	19	FZ9011V	90AV	D	32	JP2-2-5W	YJ1160	D	44
EF812	6F23/EF812	M		FZ9012G	90CG	D	32	JP2-5W	YJ1191	D	44
*EF814	EF184	C	19	FZ9012V	90CV	D	32	JP8-02B	JP8-02B	D	47
EF861	§EF180F	C	19	G6C4	§M8080	C		JP9-01	JP9-01	M	
*EF905	EF86	M		G40-25	G40-25	D	56	JP9-2-5	JP9-2-5	D	46
EH90	EH90	O		G40-50	G40-50	D	56	JP9-2-5B	YJ1000	D	46
EIP-12	EIP-12	D	59	G108/1K	†108C1	D	33	JP9-2-5C	JP9-2-5C	D	46
EL34	EL34	M		G150/3D	150C3	O		JP9-2-5D	JP9-2-5D	D	46
EL36	EL36	O		G150/4K	†150C2	D	33	JP9-2-5E	JP9-2-5E	D	46
EL81	EL81	M		GA50	90AG	D	32	JP9-2-5F	JP9-2-5D	D	46
EL84	EL84	M		GC10B/S	Z303C	O		JP9-2-5H	JP9-2-5H	D	46
EL85	EL85	O		GD75P	†75C1	D	33	JP9-2-5K	JP9-2-5K	D	
EL86	EL86	M		GD83M	83A1	D	33	JP9-2-5L	JP9-2-5L	D	46
EL91	†EL91	M		GD85M/S	†85A2	D	33	JP9-2-5M	JP9-2-5M	D	
EL95	EL95	M		GD85PR/S	§M8098	C	33	JP9-5M	JP9-5M	D	
*EL171	EL84	M		GD90M	†90C1	D	33	JP9-7	2J42	D	46
EL360	EL360	M		GD108M	†108C1	D	33	JP9-7A	JP9-7A	D	46
*EL803	EL821	C		GD150A/S	150C3	O		JP9-7D	JP9-7D	D	46
*EL803S	§EL80L	C		GD150M	†150C4	C	33	JP9-7L	JP9-7L	D	46
EL821	EL821	C		GD150M/S	†150C2	D	33	JP9-7T	JP9-7T	D	46
EL822	EL822	C		GD150P/S	†150B2	D	33	JP9-15	YJ1110	D	46
EL861	§EL81L	C		GEM1	GEM1	C	52	JP9-15B	JP9-15B	D	46
EL5070	EL5070	M		GEM2	GEM2	C	52	JP9-15C	JP9-15C	D	
ELC3J	ZT1011/	C	36	GEM3	GEM3	C	52	JP9-15D	JP9-15D	D	46
	XR1-1600A			GEM4	GEM4	C	52	JP9-15E	JP9-15E	D	
ELC3JA	ZT1011/	C	36	GL5720	XG1-2500	C	37	JP9-15F	JP9-15F	D	
	XR1-1600A			GLE10000/	RG3-250	C	37	JP9-15G	JP9-15G	D	
ELC6J/A	XR1-6400A	C	36	025/1				JP9-15J	JP9-15J	D	
ELL80	ELL80	O		GLE15000/3/12	RG4-3000	C	37	JP9-18	JP9-18	D	46
EM81	EM81	O		GN-4	ZM1020	C	34	JP9-22B	JP9-22B	S	46
EM84	EM84	M		GN-6	ZM1080	C	34	JP9-22C	YJ1124	D	
*EM85	EM81	O		GR10A	Z503M	O		JP9-22D	JP9-22D	S	46
EM87	EM87	O		*GR10J	ZM1040	M		JP9-22L	JP9-22L	S	46
*EM840	EM84	M		GR10M	ZM1020	C	34	JP9-22R	JP9-22R	S	46
EN31	EN31	O		GS10C/S	Z502S	O		JP9-50A	JP9-50A	D	46
EN32	EN32	D	36	*GS10H	Z504S	C	35	JP9-75	JP9-75	D	47
EN70	EN70	O		GS50	90CG	D	32	JP9-80	4J52A	D	47
EN91	†EN91	D	36	GT1C	AN1	O		JP9-180	JP9-180	D	45
EN92	EN92	C	36	GTE130T	Z803U	C	35	JP9-250	4J50	S	45
*ES85	TY2-125	C	39, 43	GTR95M/S	95A1	O		JP9-250A	4J78	S	45
ES204A	TY4-400	C	39, 43	GTR150M/S	150B3	O		JP9-250B	JP9-250B	S	45
ES833	TY4-350	M		GU12	RG3-250A	C	37	JP9-250C	JP9-250C	S	45
*ESU101	RG1-240A	C	37	GU18	RG3-1250	C	37	JP9-250D	JP9-250D	S	45
ESU103	RR3-250	C	37	GU20/21	RG4-1250	C	37	JP9-250E	JP9-250E	S	45
*ESU150	RG3-1250	C	37	GU23	RG4-1250	C	37	JP9-250F	JP9-250F	S	45
ESU200	RG4-1250	C	37	GU50	RG1-240A	C	37	JP35-30	7093	S	47
ESU866	RG3-250A	C	37	GXU1	RR3-250	C	37	JPG8-02B	JPG8-02B	D	
ESU866ES	RG3-250	C	37	GXU2	RR3-1250	C	37	JPG9-01	JPG9-01	S	
ET51	ET51	M		GXU3	RR3-1250A	C	37	JPG9-02	JPG9-02	S	
EY51	EY51	M		GXU4	RR3-1250B	C	37	JPG9-02B	JPG9-02B	S	
*EY83	EY88	M		GY501	GY501	C		JPG9-02C	JPG9-02C	S	44
EY84	†EY84	C		GZ34	GZ34	M		JPS9-200	YJ1180	D	45
EY86/87	EY86/87	M		*GZ40	EZ80	M		JPS16-60	YJ1320	D	45
EY88	EY88	M		HL92	HL92	O		JPT6-1	YJ1410	D	44
EZ80	EZ80	M		HP6	EF91	C	19	JPT9-01	JPT9-01	S	44
EZ81	EZ81	M		IOG-12	IOG-12	D	59	JPT9-01D	JPT9-01D	S	44
F2	1923	O		IOG-12W/	IOG-12W/	D	59	JPT9-1K	JPT9-01M	D	47
FG17	XG5-500	M		UKG2	UKG2			JPT9-01M	JPT9-01M	D	47
*FG27A	XG1-2500	C	37	IOG-13T	IOG-13T	D	59	JPT9-02	JPT9-02	D	44
FG33	XG1-2500	C	37	IOG-17	IOG-17	D	59	JPT9-02D	JPT9-02D	M	

*Replacements shown are near equivalents only.

§This is a Special Quality type. †There is a Special Quality version of this type.
electrical characteristics but not necessarily identical assessment specification.

#Replacements shown have identical

Index and equivalents—continued

Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page
	Mullard type number	Status			Mullard type number	Status			Mullard type number	Status	
JPT9-02E	JPT9-02E	C	44	M575	JP9-75	D	47	ME1501	EN32	D	36
JPT9-60	2J51A	D	47	M581	YJ1290	D	47	ME1502	AN1	O	
*K340	2K25	D	50	M597	YJ1071	D	46	ME1503	XH8-100	O	
K353	YK1090	D	50	M598B	JP9-18	D	46	ME1504	XG1-2500	C	37
K358	YK1091	D	50	M599A	JP9-2-5D	D	46	ME1505	XG2-500	O	
*K365	YK1000	D	51	M599B	JP9-2-5E	D	46	MG6-2	MG6-2	O	
*K391	YK1046	D	50	M5005	YJ1200	D	48	MG13-38	MG13-38	D	25
K3003	KS9-40G	D	50	M5022	YJ1121	D	46	MK13-16	Q13-110GU	D	25
K3018	YK1191	D	51	M5023	YJ1110	D	46	MT17	XG5-500	M	
*K3020	KS9-40B	D	50	M5031	JP9-7L	D	46	MT57	XG1-2500	C	37
KR11000	YK1091	D	50	M5042	YJ1250	D	48	MT105	XGQ2-6400	O	
KS7-85	KS7-85	D	50	M5043	YJ1300	D	46	*MT5544	XR1-3200A	C	36
KS7-85A	KS7-85A	D	50	M5064	JP9-2-5H	D	46	*MT5545	XR1-6400A	C	36
KS7-85B	KS7-85B	D	50	M8079	\$M8079	C	19	MT5557	XG5-500	M	
KS9-20	723A/B	D	50	M8080	\$M8080	C		MT5559	XG1-2500	C	37
KS9-20A	2K25	D	50	M8081	\$M8081	C		MU13-38	MU13-38	D	25
KS9-20B	KS9-20B	D	50	M8082	\$M8082	C		MV6-5	MV6-5	O	
KS9-20D	KS9-20D	D	50	M8083	\$M8083	C	19	MW13-38	MW13-38	D	25
KS9-20M	KS9-20M/2K25	D		M8091	\$M8091	C		MX118	MX118	D	58
KS9-40	KS9-40	D	50	M8096	\$M8096	M		MX119	MX119	D	58
KS9-40B	KS9-40B	D	50	M8097	\$M8097	O		MX120/01	MX120/01	D	57
KS9-40D	KS9-40D	D	50	M8098	\$M8098	C	33	MX123	MX123	D	57
KS9-40G	KS9-40G	D	50	M8099	\$M8099	O		MX124/01	MX124/01	D	58
KS35-50	55335	D	50	M8100	\$M8100	C	19	MX145	MX145	D	57
KS70-40	YK1010	D	50	M8132	\$M8132	S		MX146	MX146	D	57
KV12	KV12	D		M8133	\$M8133	S		MX147	MX147	D	57
KXR04-200	YK1090	D	50	M8136	\$M8136	C	20	MX148	MX148	D	57
KY50	U25/KY50	M		M8137	\$M8137	C	20	MX149	MX149	D	57
KY80	U26/KY80	M		M8142	\$M8142	S		MX151	MX151	D	58
LA9-2	YH1060	D	48	M8157	\$M8157	M		MX152	MX152	D	58
LA9-3B	LA9-3B	D	48	M8161	\$M8161	C	19	MX155	MX155	D	58
LB3-250B	LB3-250B	D	48	M8162	\$M8162	C	20	MX163	MX163	D	58
LB6-10	LB6-10	D	49	M8163	\$M8163	D	33	MX164	MX164	D	58
LB6-25	LB6-25	D	49	M8178	\$M8178	S		MX166	MX166	D	58
LB6-25A	LB6-25A	D	49	M8179	\$M8179	S		MX167	MX167	D	57
LB7-20E	LB7-20E	D	49	M8190	\$M8190	O		MX168	MX168	D	57
LDR03	ORP12	C		M8196	\$M8196	C	19	MX172	MX172	D	57
LN152	ECL80	M		M8204	\$M8204	D	36	MX177	MX177	D	57
LN309	PCL83	M		M8206	\$M8206	O		MX178	MX178	D	57
LZ319	PCF80	C		M8207	\$M8207	S		MX180	MX180	D	57
M17-140W	M17-140W	D	25	M8208	\$M8208	S		MY13-38	MY13-38	D	25
M17-141W	M17-141W	D	25	M8212	\$M8212	C		N77	†EL91	M	
M21-11W	M21-11W	O		M8223	\$M8223	D		N119	UL84	M	
M21-12W	M21-12W	O		M8224	\$M8224	D	33	N144	†EL91	M	
M24-100W	M24-100W	D	25	M8225	\$M8225	C	33	N152	PL81	M	
M28-10W	M28-10W	O		M8234	\$M8234	S		N153	PL83	M	
M28-12W	M28-12W	M		M8248	\$M8248	S		N154	PL82	M	
M31-120W	M31-120W	O		MAG3	2J42	D	46	*N308	PL36	M	
M36-11W	M36-11W	O		MAG4	YJ1110	D	46	N309	PL83	M	
M36-13W	M36-13W	O		MAG16	YJ1121	D	46	N329	PL82	M	
M36-16W	M36-16W	O		MC13-16	Q13-110BA	D	25	N359	PL81	M	
M38-120W	M38-120W	D	25	ME1001	TD03-10	M		N378	PL84	C	
M502	4J50	S	45	ME1005	TD03-5	M		N379	PL84	C	
M502A	JP9-180	D	45	ME1100	723A/B	D		N709	EL84	M	
M503A	JP9-7D	D	46	ME1101	2J42	D	46	*NL710	ZT1011/	C	36
M508	JP9-7A	D	46	ME1101A	YJ1110	D	46		XR1-1600A		
M511	4J78	S	45	ME1101D	JP9-7D	D	46	NL715	XG5-500	M	
M513B	YJ1110	D	46	ME1200AA	ME1200AA	O		NL1051A	ZX1051	C	36
M515	YJ1120	D	46	ME1200AG	ME1200AG	O		*OM5A	EF37A	M	
M526	2J42	D	46	ME1201AA	ME1201AA	O		OM5B	EF37A	M	
M529	JP9-250B	S	45	ME1201AG	ME1201AG	M		ORP12	ORP12	C	
M537A	YJ1070	S	48	ME1260	ME1260	O		ORP50	ORP50	O	
M538A	JP9-250F	S	45	ME1400	CV432	D	21	ORP52	ORP52	D	29
M539	JP9-250D	S	45	ME1401	CV495	D	21	ORP60	ORP60	C	29
M542	5586	D	45	ME1402	CV2730	D	21	ORP61	ORP61	D	29
M549	JP9-250F	S	45	ME1403	CV2348	D	21	ORP62	ORP62	D	29
M551	4J52A	D	47	ME1404	CV8144	D	21	ORP69	ORP69	D	29
*M559	YJ1040	S	48	ME1500	EN70	O		ORP90	ORP90	C	29

*Replacements shown are near equivalents only.

‡This is a Special Quality type.
electrical characteristics but not necessarily identical assessment specification.

†There is a Special Quality version of this type.

‡Replacements shown have identical

Index and equivalents—continued

Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page
	Mullard type number	Status			Mullard type number	Status			Mullard type number	Status	
ORP93	ORP93	C	29	*PL5544	XR1-3200A	C	36	QQZ06-40	YL1030/	M	
OT400	TY4-350	M		*PL5545	XR1-6400A	C	36		QQZ06-40		
PC86	PC86	M		PL5551A	ZX1051	C	36	QS75-20	75B1	O	
PC88	PC88	M		PL5552A	ZX1052	C	36	*QS83-3	†85A2	D	33
PC95	PC95	O		PL5553B	ZX1053	C	36	QS92-10	7475	O	
PC97	PC97	M		PL5555	5555	O		QS95-10	95A1	O	
PC900	PC900	C		PL5557	XG5-500	M		QS150-15	150B3	O	
PCC84	PCC84	M		PL5559	XG1-2500	C	37	QS150-40	150C3	O	
PCC85	PCC85	M		*PL5632	ZT1011/	C	36	QS1200	†150B2	D	33
PCC88	PCC88	O			XR1-1600A			QS1207	†150C2	D	33
PCC89	PCC89	M		PL5684	ZT1011/	C	36	QS1208	†108C1	D	33
PCC189	PCC189	M			XR1-1600A			QS1209	†85A2	D	33
PCC805	30L15/PCC805	M		PL5727	§M8204	D	36	QS1210	§M8223	D	33
PCE800	30FL1/PCE800	M		PL5822A	ZX1061	C	36	QS1211	§M8224	D	33
PCF80	PCF80	C		PL6011	ZT1011/	C	36	QS1212	§M8098	C	33
PCF82	PCF82	O			XR1-1600A			QS1215	†90C1	D	33
PCF84	PCF84	O		*PL6549	QY3-65	D	41	*QS1250	Z900T	C	35
PCF86	PCF86	M		PL6574	EN32	D	36	QV03-12	†QV03-12	C	41
PCF200	PCF200	M		PM05	†EF95	C	19	QV06-20	QV06-20	C	40, 41
PCF201	PCF201	M		PM07	†EF91	C	19	QV08-100	QV08-100	C	40, 41
PCF800	30C15/PCF800	M		PY33	PY33	M		QV08-100B	QV08-100B	C	40, 41
PCF801	PCF801	M		PY81	PY81/800	C			YL1290		
PCF802	PCF802	D	20	PY81/800	PY81/800	C		QV1-150A	QV1-150A	M	
PCF805	30C18/PCF805	M		PY82	PY82	M		QV1-150D	QV1-150D	M	
PCF806	PCF806	M		PY88	PY88	D	21	*QV2-250B	QV2-250C	D	40, 41
PCH200	PCH200	M		PY301	U191/PY301	M		QV2-250C	QV2-250C	D	40, 41
PCL82	PCL82	C		PY500	PY500A	D	21	QY2-100	QY2-100	M	
PCL83	PCL83	M		PY500A	PY500A	D	21	QY3-65	QY3-65	C	41
PCL84	PCL84	C	20	PY800	PY81/800	C		QY3-125	QY3-125	D	41
PCL85	PCL805/85	D	20	*PY801	PY81/800	C		QY3-125B	QY3-125B	M	
PCL86	PCL86	D	20	Q7-100GU	Q7-100GU	D	25	QY4-250	QY4-250	D	40, 41
PCL88	30PL14/PCL88	M		Q13-110BA	Q13-110BA	D	25	QY4-400	QY4-400	D	40, 41
PCL800	30PL13/PCL800	M		Q13-110GU	Q13-110GU	D	25	QY4-500A	QY4-500A	D	41
PCL801	30PL1/PCL801	M		QA2403	M8083	C	19	QY5-500	QY5-500	D	40, 41
PCL805	PCL805/85	D	20	QA2406	M8162	C	20	QY5-3000A	QY5-3000A	C	40, 41
PCL805/85	PCL805/85	D	20	QB2/250	QY2-100	M		QY5-3000W	QY5-3000W	D	40, 41
PD500	PD500	C	19	QB3/200	QY3-65	D	41	QZ06-20	QZ06-20	M	
*PE50	90CG	D	32	QB3/300	QY3-125	D	41	R12	EY51	M	
*PE54	90AG	D	32	QB3/300GA	QY3-125B	M		R12A	EY51	M	
PF818	30F5/PF818	M		QB3-5/750	QY4-250	D	40, 41	R18	EY84	C	
PFL200	PFL200	C	20	QB4/1100	QY4-400	D	40, 41	R121	EF37A	M	
PL2D21	†EN91	D	36	QB5/1750	QY5-500	D	40, 41	R144	†EF91	C	19
PL17	XG5-500	M		QBL4/800	QY4-500A	D	41	R265	6AS6	C	19
PL21	†EN91	D	36	QBL5/3500	QY5-3000A	C	40, 41	RG1-240A	RG1-240A	C	37
PL36	PL36	M		QBW5/3500	QY5-3000W	C	40, 41	RG1-250	RG1-250	M	
PL57	XG1-2500	C	37	QC05/35	QZ06-20	M		RG3-250	RG3-250	C	37
PL81	PL81	M		QE03/10	†QV03-12	C	41	RG3-250A	RG3-250A	C	37
PL81A	PL81A	M		QE05/40	QV06-20	C	40, 41	RG3-1250	RG3-1250	C	37
PL82	PL82	M		QE08/200	QV08-100	C	40, 41	RG3-1250GC	RG3-1250GC	S	
PL83	PL83	M		QQC03/14	QQZ03-10	M		RG4-1000	RG4-1000	O	
PL84	PL84	C		QQE02/5	QQV02-6	C	42	RG4-1250	RG4-1250	C	37
PL105	XGQ2-6400	O		QQE03/12	QQV03-10	C	42	RG4-3000	RG4-3000	C	37
PL165A	XH16-200	O		QQE03/20	QQV03-20A	C	42	RG250-300	RG3-250	C	37
PL174	XH16-200	O		QQE06/40	QQV06-40A	C	42	RG250-1000	RG1-240A	C	37
PL255	XG2-12	O		QQV02-6	QQV02-6	C	42		RG3-250	C	37
PL260	XG2-25	O		QQV03-10	QQV03-10	C	42	RG250-3000	RG3-250A		
PL302	30P19/PL302	M		*QQV03-20	QQV03-20A	C	42	RI-12	RI-12	D	60
PL345	XH3-045	O		QQV03-20A	QQV03-20A	C	42	RK48A	QY2-100	M	
PL435	XH8-100	O		QQV03-20B	QQV03-20B	C		RL17	XG5-500	M	
PL500	PL504	D	21	QQV03-25	QQV03-25	C	42	RL21	†EN91	D	36
PL504	PL504	D	21	*QQV06-40	QQV06-40A	C	42	RL57	XG1-2500	C	37
PL505	PL509	D	21	QQV06-40A	QQV06-40A	C	42	RL105	XGQ2-6400	O	
PL508	PL508	C		QQV07-40	QQV07-40	O		RPY18	RPY18	D	29
PL509	PL509	D	21	QQV07-50	QQV07-50	C	42	RPY19	RPY19	D	29
PL522	XH16-200	O		QQZ02-6	QQZ02-6	C		RPY20	RPY20	D	29
PL801	30P12/PL801	M		QQZ03-10	QQZ03-10	M		RPY30	RPY30	M	
PL802	PL802	C	21	QQZ03-20	YL1020/	M		RPY33	RPY33	D	29
PL1267	Z300T	M			QQZ03-20			RPY43	RPY43	D	29

*Replacements shown are near equivalents only.

§This is a Special Quality type.
electrical characteristics but not necessarily identical assessment specification.

†There is a Special Quality version of this type.

‡Replacements shown have identical

Index and equivalents—continued

Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page
	Mullard type number	Status			Mullard type number	Status			Mullard type number	Status	
RPY54	RPY54	D	29	TBL12/25	TY12-25A	M		TY6-5000W	TY6-5000W	C	43
RPY55	RPY55	D	29	TBW6/6000	TY6-5000W	C	43	TY7-6000A	TY7-6000A	C	39, 43
RPY58	RPY58	D	29	TBW7/8000	TY7-6000W	C	39, 43	TY7-6000H	TY7-6000H	C	39, 43
RPY71	RPY71	D	25	TBW7/9000	TY8-6000W	C	39	TY7-6000W	TY7-6000W	C	39, 43
RR3-250	RR3-250	C	37	TBW12/25	TY12-25W	M		TY8-15A	TY8-15A	C	39, 43
RR3-1250	RR3-1250	C	37	TBW12/38	TY12-20W	M		TY8-15H	TY8-15H	C	39, 43
RR3-1250A	RR3-1250A	C	37	TBW12/100	TY12-50W	M		TY8-6000A	TY8-6000A	C	39
RR3-1250B	RR3-1250B	C	37	*TC1-75	TY2-125	C	39, 43	TY8-6000H	TY8-6000H	C	39
RS613	TY2-125	C	39, 43	*TC2-250	TY4-400	C	39, 43	TY8-6000W	TY8-6000W	C	39
RS630	TY4-400	C	39, 43	*TC2-300	TY4-400	C	39, 43	TY12-20W	TY12-20W	M	
RS631	TY4-500	D	39, 43	TD03-5	TD03-5	M		TY12-25A	TY12-25A	M	
*RS683	QY3-125	D	41	TD03-10	TD03-10	M		TY12-25W	TY12-25W	M	
RS685	QY3-125	D	41	TD03-10D	TD03-10D	M		TY12-50W	TY12-50W	M	
RS686	QY4-250	D	40, 41	TD03-10E	TD03-10E	M		TY54-500	TY54-500	O	
RS687	QY5-500	D	40, 41	TD03-10F	TD03-10F	M		TY55-3000	TY55-3000	M	
*RS1002	QY4-250	D	40, 41	TD03-10G	TD03-10G	M		U25/KY50	U25/KY50	M	
RS1002A	QY4-400	D	40, 41	TD17	EN70	O		U26/KY80	U26/KY80	M	
*RS1006	TY2-125	C	39, 43	TD24	QQV03-10	C	42	U43	EY51	M	
RS1007	QY3-125	D	41	TD25	QQV06-40A	C	42	U49	EY86/87	M	
RS1009	QQV06-40A	C	42	TG200	XH8-100	O		*U52	GZ34	M	
*RS1012L	QY5-3000A	C	40, 41	TG1000	XH16-200	O		U119	UY85	M	
*RS1012W	QY5-3000W	C	40, 41	TH4J52A	4J52A	D	47	U151	EY51	M	
RS1016	TY4-500	D	39, 43	TH813	QY2-100	M		U153	PY81/800	C	
RS1019	QQV03-20A	C	42	TH1586	5586	D	45	U154	PY82	M	
RS1026	TY4-400	C	39, 43	TH5021B	RG3-250A	C	37	U191/PY301	U191/PY301	M	
RS1029	QQV03-10	C	42	TH5021V	RG3-250	C	37	U192	PY82	M	
RS1036	TY5-500	D	39	TH5221B	RR3-250	C	37	*U251	PY81/800	C	
RS1046	TY6-800	D	39	*TH5221V	RR3-250	C	37	U319	PY82	M	
*RS1081W	TY12-50W	M		TH5586	5586	D	45	U381	UY85	M	
*RS2001W	TY12-50W	M		TH6220A	XR1-6400A	C	36	U709	EZ81	M	
RY12-100	RY12-100	O		TH6250	XR1-12A	O		UABC80	UABC80	M	
S5A/180	DG13-34	M		TH6435	XH8-100	O		UB41	UB41	O	
†S6F12	\$M8083	C	19	TH6522	XH16-200	O		UBC81	UBC81	O	
S914	YJ1180	D	45	TH6907	XH25-500	O		UBF80	UBF80	M	
SIM2	SIM2	D	52	*TH7020	ZX1051	C	36	UBF89	UBF89	M	
SIM5	SIM5	D	52	*TH7030	ZX1052	C	36	UCC85	UCC85	M	
SIM8	SIM8	M		*TH7040	ZX1053	C	36	UCF80	UCF80	O	
SIM9	SIM9	M		*TQ2	XG5-500	M		UCH21	UCH21	O	
SP6	†EF91	C	19	*TQ2/6	XG2-6400	C	37	UCH71	UCH21	O	
SRS360	TY4-400	C	39, 43	TS51	†EF95	C	19	UCH81	UCH81	M	
SRS4452	QQV03-20A	C	42	TS52	†ECC91	M		UCH171	UCH81	M	
Ste1000/2-5/15	XG1-2500	C	37	TS54	\$E83F	C		UCL82	UCL82	M	
Ste1300/01/05	†EN91	D	36	TT10	QY2-100	M		UCL83	UCL83	M	
Ste2500/0-5/2	XG5-500	M		TT16	QY3-125B	M		UE967	XG5-500	M	
Ste2500/6/40	XGQ2-6400	O		TT16D	QY3-125	D	41	UF80	UF80	O	
STV85-10	†85A2	D	33	TT17	XG5-500	M		UF85	UF85	O	
STV108-30	†108C1	D	33	TT18	QQV07-40	O		UF89	UF89	M	
STV150-30	†150C2	D	33	TT20	QQV03-20A	C	42	UL84	UL84	M	
SV2D21	†EN91	D	36	TT20B	QQV03-20B	C		UM84	UM84	O	
T21-105	†ECC91	M		TT23	QQV02-6	C	42	UU12	EZ81	M	
T54P31	DH13-78	M		TT24	QQV03-10	C	42	UY85	UY85	M	
T130-1	TY2-125	C	39, 43	TT25	QQV06-40A	C	42	V40	RY12-100	O	
T350-1	TY4-400	C	39, 43	*TX2-3	XR1-3200A	C	36	V884	†EF92	C	19
T813	QY2-100	M		*TX2-6	XR1-6400A	C	36	V886	†EL91	M	
TB2-5/300	TY2-125	C	39, 43	TX920	XG1-2500	C	37	V1103	QQV03-10	C	42
TB3/750	TY4-400	C	39, 43	TY2-125	TY2-125	C	39, 43	VA50	90AV	D	32
TB4/1250	TY4-500	D	39, 43	TY3-250	TY4-400	C	39, 43	VKP series	VKP series	D	59
TB4/1500	TY5-500	D	39	TY4-350	TY4-350	M		VP6	†EF92	C	19
TB5/2500	TY6-800	D	39	TY4-400	TY4-400	C	39, 43	*VR75-30	†75C1	D	33
TBH6/14	TY8-15H	C	39, 43	TY4-400C	TY4-400C	M		*VR105-30	†108C1	D	33
TBH6/6000	TY6-5000H	C	43	TY4-500	TY4-500	D	39, 43	VR150-30	150C3	O	
TBH7/8000	TY7-6000H	C	39, 43	TY5-500	TY5-500	D	39	VS10J	ET51	M	
TBH7/9000	TY8-6000H	C	39	TY6-800	TY6-800	D	39	VS50	90CV	D	32
TBL6/14	TY8-15A	C	39, 43	TY6-1250A	TY6-1250A	C	39	VS70	7475	O	
TBL6/4000	TY6-1250A	C	39	TY6-5000A	TY6-5000A	C	43	VT123	5586	D	45
TBL6/6000	TY6-5000A	C	43	TY6-5000B	TY6-5000B	M		W77	†EF92	C	19
TBL7/8000	TY7-6000A	C	39, 43	TY6-5000B	YD1120			W719	EF85	M	
TBL7/9000	TY8-6000A	C	39	TY6-5000H	TY6-5000H	C	43	WD709	EBF80	M	

*Replacements shown are near equivalents only.

§This is a Special Quality type. †There is a Special Quality version of this type. electrical characteristics but not necessarily identical assessment specification.

‡Replacements shown have identical

Index and equivalents—continued

Type number index	Mullard replacements	Data Page	Type number index	Mullard replacements	Data Page	Type number index	Mullard replacements	Data Page
	Mullard type number	Status		Mullard type number	Status		Mullard type number	Status
X119	UCH81	M	XR1-12A	XR1-12A	O	YJ1123	YJ1123	D 46
X719	ECH81	M	XR1-1600A	ZT1011/	C 36	YJ1124	YJ1124	D 46
*XE2	CV495	D 21		XR1-1600A		YJ1140	YJ1140	S 47
XFR1	DF62	O	*XR1-3200	XR1-3200A	C 36	YJ1150	YJ1150	D 45
XFR2	DF60	O	XR1-3200A	XR1-3200A	C 36	YJ1160	YJ1160	D 44
XFY14	DL620	O	*XR1-6400	XR1-6400A	C 36	YJ1162	YJ1162	D 44
XG1-2500	XG1-2500	C 37	XR1-6400A	XR1-6400A	C 36	YJ1180	YJ1180	D 45
XG2	EN70	O	XR41	YK1010	D 50	YJ1181	YJ1181	D 45
XG2-12	XG2-12	O	XR81	55335	D 50	YJ1182	YJ1182	D 45
XG2-25	XG2-25	O	XX1020	XX1020	O	YJ1190	YJ1190	D 44
XG2-500	XG2-500	O	XX1050	XX1050	D 28	YJ1191	YJ1191	D 44
XG2-6400	XG2-6400	C 37	XX1052	XX1050	D 28	YJ1200	YJ1200	D 48
XG5-500	XG5-500	M	XX1060	XX1060	D 28	YJ1201	YJ1201	D 48
XG15-10	XG15-10	O	XX1240	XX1240	D 28	YJ1250	YJ1250	D 48
XG15-12	XG15-12	O	XX1241	XX1241	D 28	YJ1280	YJ1280	D 44
XGQ2-6400	XGQ2-6400	O	Y25	DM70	M	YJ1290	YJ1290	D 47
XH2-045	XH3-045	O	YD1120	TY6-5000B	M	YJ1300	YJ1300	D 46
XH8-100	XH8-100	O		YD1120		YJ1320	YJ1320	D 45
XH16-200	XH16-200	O	YD1150	YD1150	D 38	YJ1321	YJ1321	D 45
XH25-500	XH25-500	O	YD1152	YD1152	D 38	YJ1371	YJ1371	D 44
XN4	ZM1080	C 34	YD1160	YD1160	D 38	YJ1380	YJ1380	D 47
XP1000	XP1000	S	YD1161	YD1161	D 38	YJ1390	YJ1390	D
XP1001	XP1001	S	YD1162	YD1162	D 38	YJ1410	YJ1410	D 44
XP1002	XP1002	D 31	YD1170	YD1170	D 38	YJ1420	YJ1420	D 44
XP1003	XP1003	S	YD1171	YD1171	D 38	YJ1430	YJ1430	D 48
XP1005	XP1005	S	YD1172	YD1172	D 38	YK1000	YK1000	D 51
XP1010	XP1010	C 30	YD1173	YD1173	D 38	YK1001	YK1001	D 51
XP1015	XP1015	S	YD1180	YD1180	D 38	YK1002	YK1002	D 51
XP1021	XP1021	O	YD1182	YD1182	D 38	YK1004	YK1004	D 51
XP1023	XP1023	D	YD1190	YD1190	D 38	YK1005	YK1005	D 51
XP1030	XP1030	S	YD1192	YD1192	D 38	YK1010	YK1010	D 50
XP1031	XP1031	O	YD1193	YD1193	D 38	YK1046	YK1046	D 50
XP1110	XP1110	D 30	YD1202	YD1202	D 38	YK1090	YK1090	D 50
XP1113	XP1113	O	YD1203	YD1203	D 38	YK1091	YK1091	D 50
XP1114	XP1114	O	YD1212	YD1212	D 38	YK1110	YK1110	D 51
XP1115	XP1115	D 30	YD1213	YD1213	D 38	YK1150	YK1150	D 51
XP1116	XP1116	D 30	YD1220	TY4-400C	M	YK1151	YK1151	D 51
XP1117	XP1117	D 30	YD1240	YD1240	D 38	YK1191	YK1191	D 51
XP1118	XP1118	S	YD1244	YD1244	D 38	YK1200	YK1200	D 51
XP1120	XP1120	S	YD1300	YD1300	D 42	YL1020	YL1020/	M
XP1121	XP1121	S	YD1301	YD1301	D 42		QQZ03-20	
XP1130	XP1130	S	YD1330	YD1330	D 42	YL1030	YL1030/	M
XP1131	XP1131	S	YD1331	YD1331	D 43		QQZ06-40	
XP1143	XP1143	D 30	YD1332	YD1332	D 42	YL1070	YL1070	C 40
XP1180	XP1180	O	YD1333	YD1333	D 42	YL1080	YL1080	M
XP1210	XP1210	S	YD1342	YD1342	D 38	YL1110	YL1110	D 40, 41
XP1220	XP1220	S	YH1060	YH1060	D 48	YL1130	YL1130	M
XQ1020 series	XQ1020 series	D 26	YH1090	YH1090	D 49	YL1150	YL1150	D 40, 41
XQ1021 series	XQ1021 series	D 26	YH1170	YH1170	D 49	YL1190	YL1190	M
XQ1023 series	XQ1023 series	D 27	YH1210	YH1210	D 49	YL1240	YL1240	C 42
XQ1024 series	XQ1024 series	D 27	YJ1000	YJ1000	D 46		QV08-100B	C 40, 41
XQ1025 series	XQ1025 series	D 27	YJ1010	YJ1010	D 47	YL1290	YL1290	
XQ1026 series	XQ1026 series	D 27	YJ1011	YJ1011	D 47	YL1420	YL1420	D 41
XQ1040 series	XQ1040 series	M	YJ1020	YJ1020	S 47	YL1430	YL1430	D 41
XQ1050 series	XQ1050 series	M	YJ1021	YJ1021	S 47	YL1440	YL1440	D 41
XQ1070 series	XQ1070 series	D 26	YJ1030	YJ1030	S 44	YL1470	YL1470	D 41
XQ1070/01 series	XQ1070/01 series	D 26	YJ1040	YJ1040	S 48	YL1520	YL1520	D 41
			YJ1050	YJ1050	D 48	Z70U	Z700U	O
XQ1071 series	XQ1071 series	D 26	YJ1060	YJ1060	S 48	Z70W	Z700W	O
XQ1071/01 series	XQ1071/01 series	D 26	YJ1070	YJ1070	S 48	Z71U	Z701U	O
			YJ1071	YJ1071	D 46	Z77	†EF91	C 19
XQ1080 series	XQ1080 series	D 26	YJ1090	YJ1090	S 44	Z152	EF80	C 19
XQ1210 series	XQ1210 series	D 26	YJ1100	YJ1100	S 44	Z300T	Z300T	M
XQ1220 series	XQ1220 series	D 27	YJ1110	YJ1110	D 46	Z303C	Z303C	O
XQ1230 series	XQ1230 series	D 27	YJ1112	YJ1112	D 48	Z502S	Z502S	O
XQ1240	XQ1240	D 26	YJ1113	JP9-18	D 46	Z503M	Z503M	O
XQ1241	XQ1241	D 26	YJ1120	YJ1120	D 46		Z504S	
XR1-12	XR1-12A	O	YJ1121	YJ1121	D 46		ZM1070	C 35

*Replacements shown are near equivalents only.

†This is a Special Quality type.

†There is a Special Quality version of this type. electrical characteristics but not necessarily identical assessment specification.

†Replacements shown have identical

Index and equivalents—continued

Type number Index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page
	Mullard type number	Status			Mullard type number	Status			Mullard type number	Status	
Z505S	Z505S	C	35	ZZ1000	ZZ1000	C	33	3BKP2	DN7-78	M	
Z520M	ZM1060	C	34	0A2	†150C2	D	33	3BKP31	DH7-78	M	
Z521M	ZM1020	C	34	0A2WA	‡M8223	D	33	3BYP31	DH7-11	D	24
Z522M	ZM1021	C	34	*0A3	†75C1	D	33	*3C23	ZT1011/	C	36
Z550M	ZM1040	M		0A4G	Z300T	M			XR1-1600A		
Z700U	ZM1050	O		0B2	†108C1	D	33	3C45	XH3-045	O	
Z700W	Z700U	O		0B2WA	‡M8224	D	33	*3C/351H	TY4-350	M	
Z701U	Z700W	O		0D3	150C3	O		*3D21A	EL360	M	
Z719	Z701U	O		0E3	85A1	M		*3DT6	†6AS6	C	19
Z729	EF80	C	19	0G3	†85A2	D	33	*3G/501A	XR1-6400A	C	36
Z803U	†EF86	M		0253	BXY32	D	53	3G/502A	XR1-6400A	C	36
Z900T	Z803U	C	35	1AD4	DF62	O		*3J/192E	TY6-5000A	C	43
Z15021	Z900T	C	35	1G35	XH8-100	O		*3J/202E	TY7-6000A	C	39, 43
Z15048	TY6-800	D	39	1G45P	XH3-045	O		*3L5T	TY7-6000A	C	39, 43
ZA1002	TY4-400C	M		*1G50	EN32	D	36	*3Q/221E	TY12-20W	M	
ZA1004	ZA1002	D	33	*1M1	DM70	M		*3Q/252E	TY12-20W	M	
ZD152	ZA1004	D	33	1M3	DM70	M		*3Q/260E	TY12-20W	M	
ZM1000	EBF80	M		*1N16	RG1-240A	C	37	*3Q/261E	TY12-20W	M	
ZM1000R	ZM1000	D	34	1N23D	BAW95D	D	52	*3T500A1	TY4-500	D	39, 43
ZM1001	ZM1000R	D	34	1N23E	BAW95E	D	52	*3T1100	TY6-800	D	39
ZM1001R	ZM1001	D	34	1N23F	BAW95F	D	52	*3V5T	TY7-6000W	C	39, 43
ZM1020	ZM1001R	D	34	1N23WE	BAW95E	D	52	*3V20T	TY12-20W	M	
ZM1021	ZM1020	C	34	1N78E	AAV52	D	52	*3V25T	TY12-20W	M	
ZM1022	ZM1021	C	34	1N78ER	AAV52R	D	52	*3V202-3	TY12-20W	M	
ZM1023	ZM1022	C	34	1N78G	AAV51	D	52	3V390A	XG1-2500	C	37
ZM1024	ZM1023	C	34	1N78GR	AAV51R	D	52	3V490A	XG2-6400	C	37
ZM1040	ZM1024	O		1N415D	BAW95D	D	52	3WP1	DG7-36	O	
ZM1041	ZM1040	M		1N415E	BAW95E	D	52	3WP11	DB7-36	O	
ZM1042	ZM1041	M		1N415F	BAW95F	D	52	4-65A	QY3-65	D	41
ZM1050	ZM1042	M		1N4885	1N4885	D	53	4-125A	QY3-125B	M	
ZM1060	ZM1050	O		1N5152	1N5152	D	53	4B13	QY2-100	M	
	Z505S	C	35	1N5153	1N5153	D	53	4B32	RR3-1250	C	37
	ZM1060			1N5155	1N5155	D	53	4C35	XH8-100	O	
	Z504S	C	35	1N5157	1N5157	D	53	4CM4	PC86	M	
ZM1070	ZM1070	C	35	*1P37	90AG	D	32	4CX250B	QV2-250C	D	40, 41
ZM1080	ZM1080	C	34	*1P41	53CG	M		4CX250FG	8621	C	
ZM1081	ZM1081	C	34	1S2	DY86/87	C		4CX250R	7580W	C	
ZM1082	ZM1082	C	34	1S2A	DY86/87	C		*4D21	QY3-125	D	41
ZM1083	ZM1083	C	34	2B29	QQV07-40	O		*4D32	QY3-65	C	41
ZM1162	ZM1162	D	34	2B46	QV06-20	C	40, 41	4DL4	PC88	M	
ZM1163	ZM1163	D	34	2B52	QQV03-20A	C	42	*4DT6	†6AS6	C	19
ZM1164	ZM1164	D	34	2B94	QQV06-40A	C	42	*4E2T	QY3-125	D	41
*ZM1170	ZM1174 or	D	34	2D21	†EN91	D	36	4F15R	QV2-250C	D	40, 41
	ZM1176	D	34	2D21W	‡M8204	D	36	4F21	QY3-125	D	41
*ZM1172	ZM1175 or	D	34	2G57	XG5-500	M		4FY5	PC97	N	
	ZM1177	D	34	2G/402A	RR3-250	C	37	4G/280K	†EN91	D	36
ZM1174	ZM1174	D	34	2G/472	RR3-1250	C	37	4HA5	PC900	C	
ZM1175	ZM1175	D	34	2G/473C	RR3-1250A	C	37	4H32	RR3-1250	C	37
ZM1176	ZM1176	D	34	2H28	RR3-250	C	37	*4H73	RG4-1250	C	37
ZM1177	ZM1177	D	34	2H66	RG3-250A	C	37	*4H88A	RG4-1250	C	37
ZM1200	ZM1200	D	35	2J42	2J42	D	46	4H/135M	QV2-250C	D	40, 41
ZM1206	ZM1206	D	35	2J51A	2J51A	D	47	4H/136M	QV1-150D	M	
ZM1232	ZM1235	D	34	2J53	725A	D	46	4H/160M	QV2-250C	D	40, 41
ZM1235	ZM1235	D	34	2J55	2J55	D	48	*4H/180E	QY4-500A	D	41
ZM1237	ZM1237	D	34	2K25	2K25	D	50	*4H/181F	QY4-500A	D	41
ZM1251	ZM1251	D	34	*2M4B	GZ34	M		4J50	4J50	S	45
*ZM1260	ZM1263	D	34	2V/400A	RG3-250A	C	37	4J52A	4J52A	D	47
*ZM1262	ZM1263	D	34	*2V/400B	RG3-250A	C	37	4J78	4J78	S	45
ZM1263	ZM1263	D	34	*2V/471C	RG3-1250	C	37	4Q025	RG3-250	C	37
ZM1400 series	ZM1400 series	D	35	*2V/471A	RG3-1250	C	37	*4T17	TY2-125	C	39, 43
ZT1000	ZT1000	O		*2V/490C	RG4-1250	C	37	4X150A	QV1-150A	M	
ZT1011	ZT1011/	C	36	2V/500C	RG4-1250	C	37	4X150D	QV1-150D	M	
	XR1-1600A			3ALP1	DG7-5	M		4X250B	QV2-250C	D	40, 41
ZX1051	ZX1051	C	36	3ALP7	DP7-5	M		4X500A	QY4-500A	D	41
ZX1052	ZX1052	C	36	3AMP1	CV2431	O		*5A/157D	EF37A	M	
ZX1053	ZX1053	C	36	3AMP1A	DG7-32	D	24	*5A/159H	†EF91	C	19
ZX1061	ZX1061	C	36	3B28	RR3-250	C	37	5A/160H	†EF91	C	19
ZX1062	ZX1062	C	36	*3B/340B	XG5-500	M		5A/160K	†EF91	C	19

*Replacements shown are near equivalents only.

‡This is a Special Quality type.

†There is a Special Quality version of this type.

‡Replacements shown have identical

electrical characteristics but not necessarily identical assessment specification.

*5A/163K

to

*12AZ7

Index and equivalents—continued

Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page
	Mullard type number	Status			Mullard type number	Status			Mullard type number	Status	
*5A/163K	§E180F	C	19	6C4WA	§M8080	C		6L13	†ECC83	C	20
5A/170K	§E180F	C	19	6C12	ECH81	M		6L16	ECC84	M	
5A/189K	§M8083	C	19	6C16	ECF80	C	20	6L34	†EC91	M	
5ADP1	DG13-34	O		6CA4	EZ81	M		6LD12	EABC80	O	
5ADP2	DN13-34	O		6CA7	EL34	M		6LD13	EBC81	O	
5ADP7	DP13-34	O		*6CD6G	EL360	M		6N8	EBF80	M	
5AR4	GZ34	M		6CF8	EF86	M		6P15	EL84	M	
*5B/152D	EL360	M		*6CG7	§E80CC	C		6P17	†EL91	M	
*5B/257	QV06-20	C	40, 41	6CH6	EL821	C		*6QL6	EL86	M	
*5B/258	EL360	M		6CJ6	EL81	M		6S2	EY86/87	M	
*5B/600A	QY3-65	D	41	*6CL6	EL822	C		6S2A	EY86/87	M	
*5B/700A	QY3-65	D	41	6CM4	†EC86	M		6T8	EABC80	O	
5C22	XH16-200	O		6CM5	EL36	O		*6T35	TY6-800	D	39
5C/100A	QY2-100	M		*6CN7	EBC81	O		*6V3A	EY88	M	
*5D22	QY4-250	D	40, 41	6CQ6	†EF92	C	19	6V4	EZ80	M	
5F22A	QY4-250	D	40, 41	6CQ6S	§M8161	C	19	6X2	EY51	M	
5F23A	QY4-400	D	40, 41	6CS6	EH90	O		6/30L2	6/30L2/ECC804	M	
*5H69	RG4-3000	C	37	6CW5	EL86	M		7AN7	PCC84	C	
*5HG8	PCF86	M		6CW7	ECC84	M		7C23	TY6-5000A	C	43
5J26	5J26	D	45	6D2	†EB91	C	19	7D9	†EL91	M	
*5T4	GZ34	M		6DA5	EM81	O		7D10	EL821	C	
*5T20	TY4-400	C	39, 43	6DA6	EF89	M		7DJ8	PCC88	O	
*5T21	TY4-400	C	39, 43	*6DB6	†6AS6	C	19	7FC7	PCC89	M	
*5T30	TY4-500	D	39, 43	6DC8	EBF89	M		*8A8	PCF80	C	
*5T31	TY4-500	D	39, 43	6DJ8	†ECC88	C	20	8D3	†EF91	C	19
5T33	TY4-350	M		*6DK6	†EF91	C	19	*8D5	†EF86	M	
*5V4	GZ34	M		6DL4	EC88	M		*8D8	†EF86	M	
6AB8	ECL80	M		6DL5	EL95	M		*8F66R	QY4-400	D	40, 41
*6AC7	EF80	C	19	6DR8	EBF83	O		8GJ7	PCF801	M	
*6AG7	EL821	C		6DS8	ECH83	M		8HG8	PCF86	M	
6AJ8	ECH81	M		*6DT5	EL81	M		*8QR5	XG2-6400	C	37
6AK5	†EF95	C	19	*6DT6	†6AS6	C	19	*8T72	TY12-20W	M	
†6AK5W	§M8100	C	19	*6DT8	†ECC81	C	20	*8T90	TY12-20W	M	
*6AK6	†EL91	M		6EH7	EF183	C	19	*8T92	TY12-20W	M	
6AK8	EABC80	O		6EJ7	EF184	C	19	9A8	PCF80	C	
6AL3	EY88	M		*6EL7	EF80	C	19	9AQ8	PCC85	M	
6AL5	†6AL5	M		*6EM5	EL84	M		*9BR8	PCF82	O	
†6AL5W	§M8212	C		6ES8	ECC189	M		9D6	†EF92	C	19
6AM5	†EL91	M		6ET6	EF98	M		*9D7	EF85	M	
6AM6	†EF91	C	19	*6EW6	EF184	C	19	9ED4	PD500	C	19
†6AM6S	§M8083	C	19	6F12	†EF91	C	19	9JW8	PCF802	D	20
6AQ4	†EC91	M		*6F18	EF89	M		*9T71	TY12-50W	M	
6AQ8	ECC85	M		6F19	EF85	M		9U8	PCF82	O	
*6AR6	EL34	M		6F21	†EF92	C	19	10C14	UCH81	M	
*6AS5	EL81	M		6F22	†EF86	M		10F18	UF89	M	
6AS6	†6AS6	C	19	6F23	6F23/EF812	M		10FD12	UBF89	M	
†6AS6W	§M8196	C	19	6F26	EF85	M		10L14	UCC85	M	
*6AS7G	6080	C		6F29	EF183	C	19	10LD12	UABC80	M	
6AT6	EBC90	O		6F30	EF184	C	19	10LD13	UBC81	O	
6AU6	6AU6	O		*6F33	†6AS6	C	19	10P18	UL84	M	
*6AU7	†ECC82	C	20	6F50R	QY4-500A	D	41	10PL12	UCL82	M	
6AX8	ECF82	M		6FC7	ECC89	O		11D12	6080	C	
6BD7A	EBC81	O		6FD12	EBF89	M		11E13	QQV03-10	C	42
6BK8	EF86	M		6FG6	EM84	M		11E14	EL360	M	
6BL8	ECF80	C	20	6FW8	ECC189	M		11E15	QQV03-20A	C	42
6BM8	ECL82	M		6G10	XGQ2-6400	O		11E16	QQV06-40A	C	42
*6BN4A	†EC91	M		*6G45	XR1-6400A	C	36	*12A6	CV2411	S	
6BN5	EL85	O		*6GK6	EL84	M		*12AD5	UF89	M	
6BQ5	EL84	M		6GM8	ECC86	M		*12AD6	ECH83	M	
*6BR7	EF86	M		6GW8	ECL86	M		*12AN8	ECH81	M	
*6BR8	ECF82	M		*6H51	RG4-3000	C	37	12AT7	†ECC81	C	20
*6BS7	EF86	M		6HG8	ECF86	O		†12AT7WA	§M8162	C	20
*6BS8	ECC84	M		6HU6	EM87	O		12AU7	†ECC82	C	20
*6BU8	QQV02-6	C	42	*6J4WA	§M8248	S		†12AU7WA	§M8136	C	20
*6BW4	EZ81	M		6J6	†ECC91	M		12AV6	HBC91	M	
6BX6	EF80	C	19	†6J6WA	§M8081	C		12AX7	†ECC83	C	20
6BY7	EF85	M		6JX8	ECH84	M		†12AX7WA	§M8137	C	20
*6BZ6	†EF92	C	19	6L12	ECC85	M		*12AZ7	†ECC81	C	20

*Replacements shown are near equivalents only.

§This is a Special Quality type.
electrical characteristics but not necessarily identical assessment specification.

†There is a Special Quality version of this type.

‡Replacements shown have identical

Index and equivalents—continued

Type number index	Mullard replacements	Data Page	Type number index	Mullard replacements	Data Page	Type number index	Mullard replacements	Data Page
	Mullard type number	Status		Mullard type number	Status		Mullard type number	Status
*12CU6	PL36	M	30PL13	30PL13/PCL800	M	238B	5555	O
*12DF7	§M8137	C	30PL14	30PL14/PCL88	M	255	XG2-12	O
*12DM7	†ECC83	C	33A	EL821	C	260	XG2-25	O
*12DT5	EL81	M	38A3	UY85	M	272	XG5-500	M
12DT7	†ECC83	C	39A	†ECC82	C	309	XG5-500	M
*12EN6	EL81	M	40KG6	PL509	D	*403B	§M8100	C
12K7GT	12K7GT	O	42EC4	PY500A	D	*404A	§E180F	D
12K8GT	12K8GT	O	*44A/160M	QQV03-10	C	*409A	†6AS6	C
*12QR205	XG1-2500	C	45B5	UL84	M	*416B	EC157	M
12SN7GT	12SN7GT	O	50BM8	UCL82	M	*435	§E180F	C
14D12	TY5-500	D	50C5	HL92	O	*502A	†EN91	D
14GW8	PCL86	C	52AVP	52AVP	O	517	RG5-500	M
15A6	PL83	M	52CG	52CG	O	*575A	RG4-3000	C
15CW5	PL84	C	*52KU	GZ34	M	*624	XG2-6400	C
15D12	TY6-800	D	53AVP	53AVP	O	631	XG1-2500	C
15DQ8	PCL84	C	53CG	53CG	M	*632B	XG1-2500	C
16A	†EL91	M	53CV	53CV	M	651	ZX1052	C
16A5	PL82	M	53UVP	53UVP	O	652	ZX1051	C
16A8	PCL82	C	54AVP	54AVP	O	*655	ZX1053	C
17	XG5-500	M	56AVP	56AVP	O	656	ZX1052	C
17C8	UBF80	M	56CVP	56CVP	O	657	ZX1051	C
17CVP4	AW43-88	M	56DUVP	56DUVP	D	*673	RG4-3000	C
17KW6	PL508	C	56DVP	56DVP	D	676	XG2-6400	C
17Z3	PY81/800	C	56DVP/03	56DVP/03	O	710	ZT1011/	C
18GV8	PCL805/85	D	56TUVP	56TUVP	D		XR1-1600A	
19A58	UCH81	M	56TVP	56TVP	D	715	XG5-500	M
*19BG6G	PL36	M	56UVP	56UVP	O	723A/B	723A/B	D
19D8	UCH81	M	57	XG1-2500	C	725A	725A	D
19FL8	UBF89	M	57AVP	57AVP	D	731A	†EF95	C
19SU	PY82	M	58AVP	58AVP	D	*812	QY4-250	D
19Y3	PY82	M	58CG	58CG	M	*812A	TY2-125	C
*20A2	EN32	D	58CV	58CV	M	813	QY2-100	M
20A3	†EN91	D	58DVP	58DVP	D	*814	QY3-65	D
20CG	20CG	O	58UVP	58UVP	O	829B	QQV07-40	O
20CV	20CV	O	60AVP	60AVP	S	833A	TY4-350	M
*20D4	ECH81	M	63TP	ECL80	M	*860	QY3-125	D
20PE11	20PE11	D	75B1	75B1	O	*865E	QV06-20	C
20PE13	20PE13	D	75C1	†75C1	D	866A	RG3-250A	C
*21A1	EN32	D	83A1	83A1	D	*884	†EN91	D
21A6	PL81	M	85A1	85A1	M	*855	†EN91	D
21B12	ZT1011/	C	85A2	†85A2	D	*925	90CV	D
	XR1-1600A		90AG	90AG	D	966	RG3-250A	C
21DKP4	AW53-88	O	90AV	90AV	D	967	XG5-500	M
21DKP4A	AW53-88	O	90C1	†90C1	D	1257	XG1-2500	C
22A	EF37A	M	90CG	90CG	D	1267	Z300T	M
*22S/200A	GZ34	M	90CV	90CV	D	*1513	TY5-500	D
*23D	DG7-6	M	92AG	92AG	D	*1619	QV06-20	C
23DGP4	A59-23W/inckit	M	92AV	92AV	D	*2050	EN32	D
23DHP4	A59-23W/inckit	M	95A1	95A1	O	2100A	RY12-100	O
23SP4	A59-23W/inckit	M	105	XGQ2-6400	O	3861B	QV2-250C	C
25E5	PL36	M	108C1	†108C1	D	3874A	QY2-100	M
25UP22	A63-120X	M	150AV	150AV	D	4049C	RG3-1250	C
27GB5	PL504	D	150AVP	150AVP	D	4049D	RG4-1250	C
*28AK8	UABC80	M	150B2	†150B2	D	4065	CV495	D
30AE3	PY88	D	150B3	150B3	O	4066	CV2730	D
30C1	PCF80	C	150C2	†150C2	D	4068	CV2348	D
30C15	30C15/PCF800	M	150C3	150C3	O	4069	CV8144	D
30C18	30C18/PCF805	M	150C4	†150C4	C	4261	XG5-500	M
30F5	30F5/PF818	M	150CV	150CV	D	*4313C	Z300T	M
30FL1	30FL1/PCE800	M	150CVP	150CVP	D	*4648	RG3-250A	C
30L1	PCC84	M	150TV	150TV	D	5121	†EN91	D
30L15	30L15/PCC805	M	150UV	150UV	O	5221	RR3-250	C
*30P4	PL36	M	150UVP	150UVP	O	5528	XR1-8400A	C
30P12	30P12/PL801	M	*152AVP	XP1110	D	5544	XR1-3200A	C
30P16	PL82	M	155UG	155UG	D	5545	XR1-8400A	C
30P18	PL84	C	163Pen	PL82	M	5551A	ZX1051	C
30P19	30P19/PL302	M	171DPP	UBF80	M	5552A	ZX1052	C
30PL1	30PL1/PCL801	M	213Pen	PL81	M	5553B	ZX1053	C

*Replacements shown are near equivalents only.

§This is a Special Quality type. †There is a Special Quality version of this type. electrical characteristics but not necessarily identical assessment specification.

*Replacements shown have identical

5555

to

7534

Index and equivalents—continued

Type number index	Mullard replacements	Data Page	Type number index	Mullard replacements	Data Page	Type number index	Mullard replacements	Data Page
	Mullard type number	Status		Mullard type number	Status		Mullard type number	Status
5555	5555	O	†6064	\$M8083	C 19	6626	\$M8223	D 33
5557	XG5-500	M	†6065	\$M8161	C 19	6627	\$M8224	D 33
5559	XG1-2500	C 37	†6067	\$M8136	C 20	*6663	\$M8212	C
5586	5586	D 45	6073	\$M8223	D 33	*6677	EL84	M
*5591	\$M8100	C 19	6074	\$M8224	D 33	*6678	ECF82	M
5632	ZT1011/ XR1-1600A	C 36	6075	QY5-3000W	C 40, 41	*6679	\$M8162	C 20
5644	\$5644	O	6076	QY5-3000A	C 40, 41	*6680	\$M8136	C 20
5651	†85A2	D 33	6077	TY12-50W	M	6681	\$M8137	C 20
5651WA	\$M8098	C 33	6079	QY5-500	D 40, 41	6686	\$E81L	C
†5654	\$M8100	C 19	6080	6080	C	6688	\$E180F	C 19
†5654/6AK5W	\$M8100	C 19	6084	\$E80F	C	6689	\$E83F	C
†5654/6AK5W/ 6096	\$M8100	C 19	6085	\$E80CC	C	6693	RG4-3000	C 37
*5656	QQV02-6	C 42	*6086	\$E83F	C	6700	ET51	M
*5663	EN92	C 36	6096	\$M8100	C 19	6779	Z803U	C 35
5672	DL620	O	6097	\$M8212	C	6786	XG15-10	M
5678	DF60	O	*6098	EL84	M	6807	XR1-6400A	C 36
5684	ZT1011/ XR1-1600A	C 36	6099	\$M8081	C	*6808	XR1-6400A	C 36
*5685	XR1-6400A	C 36	†6100	\$M8080	C	6850	QQV03-20A	C 42
*5687	\$E182CC	C	†6100/6C4WA	\$M8080	C	*6860	XR1-6400A	C 36
5696	EN92	C 36	†6101	\$M8081	C	*6901	QQV03-20A	C 42
5720	XG1-2500	C 37	†6101/6J6WA	\$M8081	C	6914	6914	O
†5725	\$M8196	C 19	6120	XGQ2-6400	O	6922	\$E88CC	C 20
†5725/6AS6W	\$M8196	C 19	6130	XH3-045	O	6923	EA52	C 19
†5726	\$M8212	C	6135	\$M8080	C	6929	6929	D 28
†5726/6AL5W	\$M8212	C	6146	QV06-20	C 40, 41	6939	QQV02-6	C 42
†5726/6AL5W/ 6097	\$M8212	C	6155	QY3-125	D 41	6960	TY7-6000W	C 39, 43
5727	\$M8204	D 36	6156	QY4-250	D 40, 41	6961	TY7-6000A	C 39, 43
5727/2D21W	\$M8204	D 36	6187	\$M8196	C 19	6972	6972	D
5728	XG1-2500	C 37	†6189	\$M8136	C 20	6977	DM160	C 21
*5751	\$M8137	C 20	*6197	\$E80L	C	7008	YJ1010	D 47
*5762	TY6-5000B	M	6199	150AVP	D 30	*7020	ZX1051	C 36
5763	†QV03-12	C 41	6201	\$M8162	C 20	7021	ZX1051	C 36
†5783WA	\$M8190	O	6220A	XR1-6400A	C 36	*7025	†ECC83	C 20
*5800	CV2730	D 21	6227	\$E80L	C	*7027	EL34	M
*5814A	\$M8136	C 20	*6249	4J50	S 45	7028	JP9-2-5E	D 46
5822A	ZX1061	C 36	6250	XR1-12A	O	*7030	ZX1052	C 36
5823	Z900T	C 35	6252	QQV03-20A	C 42	7031	ZX1052	C 36
5855	XR1-12A	O	6263	6263	D	7034	QV1-150A	M
5861	TD03-10G	M	6264	6264	D	7035	QV1-150D	M
5866	TY2-125	C 39, 43	6267	EF86	M	*7040	ZX1053	C 36
5867	TY4-400	C 39, 43	6268	XH8-100	O	7041	ZX1053	C 36
5868	TY4-500	D 39, 43	6279	XH16-200	O	*7044	\$E182CC	C
5876	5876	D	6291	150AVP	D 30	7062	\$E180CC	C
5877	XR1-3200A	C 36	*6293	QV06-20	C 40, 41	7088	YJ1030	S 44
*5886	CV2348	D 21	6308	\$M8142	S	7090	7090	D 44
5893	5893	D	6346	ZX1051	C 36	7091	YJ1162	D 44
5894	QQV06-40A	C 42	6347	ZX1052	C 36	7092	TY6-800	D 39
5895	QQZ04-15	O	6348	ZX1053	C 36	7093	7093	S 47
5920	\$E90CC	C	*6350	\$E182CC	C	7111	YJ1011	D 47
5923	TY6-5000W	C 43	6354	†150B2	D 33	7119	\$E182CC	C
5924	TY6-5000A	C 43	6360	QQV03-10	C 42	*7136	RG4-3000	D 37
5949	XH25-500	O	6370	E1T	M	*7181	JP9-75	D 47
*5963	\$M8136	C 20	6374	†EY84	C	*7189	EL84	M
*5964	\$E90CC	C	*6417	QV03-12	C 41	7203	QV2-250C	D 40, 41
*5965	\$E180CC	C	6435	XH3-045	O	7237	TY7-6000A	C 39, 43
6011	ZT1011/ XR1-1600A	C 36	†6443	\$M8091	C	7262A	7262A	D 26
6027H	YJ1060	S 48	6463	\$6463	O	7292	YJ1160	D 44
6031	XG1-2500	C 37	6482	Z303C	O	*7297	XR1-3200A	C 36
†6057	\$M8137	C 20	†6486	\$M8196	C 19	*7298	XR1-6400A	C 36
†6058	\$M8079	C 19	†6516	\$M8082	C	*7299	XR1-6400A	C 36
†6060	\$M8162	C 20	6521	6521	D 48	7308	\$E188CC	C
†6062	\$M8096	M	6522	XH16-200	O	*7316	\$M8136	C 20
			*6524	QQV03-20A	C 42	*7320	EL84	M
			*6549	QY3-65	D 41	*7321	XR1-6400A	D 36
			6574	EN32	D 36	7378	QV08-100	C 40, 41
			†6582	\$M8100	C 19	7386	XR1-6400	M
			6617	TY12-25W	M	7527	QY4-400	D 40, 41
			6618	TY12-25A	M	7534	E130L	C

*Replacements shown are near equivalents only.

†This is a Special Quality type.
electrical characteristics but not necessarily identical assessment specification.

†There is a Special Quality version of this type.

†Replacements shown have identical

Index and equivalents—continued

Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page	Type number index	Mullard replacements		Data Page
	Mullard type number	Status			Mullard type number	Status			Mullard type number	Status	
7580	7580	C		8254	§EC1000	O		18504	MX147	D	57
7580W	7580W	C		8255	§E88C	M		18505	MX148	D	57
7609	7609	C		8268	TY8-6000W	C	39	18506	MX149	D	57
7643	§E80CF	C		8269	TY8-6000A	C	39	18509	MX151	D	58
7650	YL1110	D	40, 41	8270	ZT1000	O		18515	MX152	D	58
7704	7704	C		8348	YL1080	M		18518	MX155	D	58
7709	Z700W	O		*8356	YJ1040	D	48	18520	MX120/01	D	57
7710	Z700U	O		8408	YL1130	M		18529	MX163	D	58
7711	Z701U	O			Z504S	C	35	18536	MX166	D	58
7721	§D3a	S		8433	ZM1070	C		18545	MX145	D	57
7722	§E280F	C		8436	EC158	M		18546	MX167	D	57
7737	§E186F	C		8458	YL1240	D	42	18550	MX164	D	58
7753	TY6-1250A	C	39	8505	YL1520	D	41	18552	MX177	C	57
7788	§E810F	C	19, 21	8532	§M8248	S		18553	MX178	C	57
7804	TY8-15A	C	39, 43	8579	YL1150	D	40, 41	38217	XG5-500	M	
7807	TY12-20W	M		8580	YL1190	M		55035	2J42	D	46
7900	7900	C		8608	EL5070	M		55040	725A	D	46
7980	83A1	D	33	8621	8621	C		55125	YJ1191	D	44
7981	XR1-3200A	C	36	8666	YD1170	D	38	55230	5J26	D	48
7983	QQZ03-10	M		8667	YD1171	D	38	55335	55335	D	50
8020	RY12-100	O		8668	YD1172	D	38	55370	YK1010	D	50
8037	ZM1020	C	34	8680	YD1212	D	38	55390	2K25	D	50
8042	QZ06-20	M		8728	YD1150	D	38	55391	723A/B	D	50
8063	ZT1011/	C	36	8730	YD1152	D	38	55850AM	XQ1044	M	
	XR1-1600A			8731	YD1160	D	38	55850F	XQ1040	M	
8108	EC157	M		8732	YD1161	D	38	55850N	XQ1043	M	
8117	YL1070	D	40	8733	YD1162	D	38	55850S	XQ1042	M	
8118	YL1020/	M		8734	YD1173	D	38	55851-2-AM	XQ1044	M	
	QQZ03-20			8735	YD1182	D	38	55851-2-N	XQ1043	M	
8177	QY3-1000A	M		8736	YD1192	D	38	55875 series	55875 series	M	
8223	E288CC	C		8752	YD1202	D	38	55875-IG series	55875-IG series	M	
8228	ZZ1000	C	33	*18042	§E83F	C		56000	RY12-100	O	
8233	§E55L	C	21	18503	MX146	D	57				

*Replacements shown are near equivalents only.

§This is a Special Quality type. †There is a Special Quality version of this type.
electrical characteristics but not necessarily identical assessment specification.

‡Replacements shown have identical



Receiving valves

r. f. pentodes book 2 part 1

Type No.	Description	gm (mA/V)	$-V_{g1} \ddagger$ (V)	$\mu g_1 - g_2$	r_a (M Ω)	V_a (V)	V_{g2} (V)	$-V_{g1}$ (V)	I_a (mA)	I_{g2} (mA)	$I_{h \uparrow}$ (mA)	Base
EF92 (CV131) §M8161 (CV4015)	Variable- μ	2.45	27	30	0.9	200	200	2.5	8.25	2.1	200	B7G
6AS6 (CV2522) §M8196 (CV4011)	Dual control	3.2	—	—	0.15	120	120	2.0	5.1	3.5	175	B7G
EF95 (CV850) §M8100 (CV4010)	Low Noise	5.1	—	35	0.4	180	120	2.0	7.7	2.4	175	B7G
EF80 (CV1376)	General purpose	7.4	—	50	0.4	170	170	2.0	10	2.5	300	B9A
EF91 (CV138) §M8083 (CV4014)	General purpose	7.6	—	70	> 0.5	250	250	2.0	10	2.6	300	B7G
EF183	Frame grid, variable- μ	12.5	14.5	—	0.5	200	90	2.0	12	4.5	300	B9A
EF184	Frame grid, sharp cut-off	15	—	60	0.38	200	200	2.5	10	4.1	300	B9A
§E180F (CV3998)	Wideband amplifier	16.5	—	50	0.09	180	150	1.25	13	3.3	300	B9A
§E810F (CV5809)	Wideband amplifier	50	—	57	0.042	120	150	1.9	35	5.0	340	B9A

§ This is a Special Quality Type.

† $V_h = 6.3V$.

‡ For 100:1 reduction in gm.

diodes and double diodes

Type No.	Description	P.I.V. max. (V)	I_a max. (mA)	i_a (pk) max. (mA)	$I_{h \uparrow}$ (mA)	Base
EB91 (CV140) §M8079 (CV4025)	Double Diode with separate cathodes	420 _a	9.0 _a	54 _a	300	B7G
EA52 (CV5140)	U.H.F. Measurements Diode	1000 _b	0.3 _b	5.0 _b	300	Flying Lead

_a Design Centre Ratings.

_b Absolute Ratings.

§ This is a Special Quality Type.

† $V_h = 6.3V$.

triode

Type No.	Description	V_a (kV)	p_a max. (W)	$-V_g$ at $I_a = 1.5mA$ (V)	$-V_g$ max. at $I_a = 0.1mA$ (V)	V_h (V)	I_h (mA)	Base
PD500	Shunt stabiliser for colour tv	25	30	7 to 30	40	7.3	300	B9D



Receiving valves

double triodes book 2 part 1

Type No.	μ	g_m (mA/V)	r_a (k Ω)	V_a (V)	$-V_g$ (V)	I_a (mA)	V_h (V)	I_h (mA)	Base
ECC82 (CV491) §M8136 (CV4003)	17	2.2	7.7	250	8.5	10.5	$\left\{ \begin{matrix} 6.3 \\ 12.6 \end{matrix} \right\}$	$\left\{ \begin{matrix} 300 \\ 150 \end{matrix} \right\}$	B9A
ECC88	33	12.5	2.65	90	1.3	15	6.3	365	B9A
§E88CC (CV2492) §E88CC/01 (CV2493)	33	12.5	2.65	90	1.2	15	6.3	300	B9A
ECC81 (CV455) §M8162 (CV4024)	60	5.5	11	250	2.0	10	$\left\{ \begin{matrix} 6.3 \\ 12.6 \end{matrix} \right\}$	$\left\{ \begin{matrix} 300 \\ 150 \end{matrix} \right\}$	B9A
§M8137 (CV4004)	90	1.6	56	250	2.0	1.25	$\left\{ \begin{matrix} 6.3 \\ 12.6 \end{matrix} \right\}$	$\left\{ \begin{matrix} 300 \\ 150 \end{matrix} \right\}$	B9A
ECC83 (CV492)	100	1.6	62.5	250	2.0	1.2	$\left\{ \begin{matrix} 6.3 \\ 12.6 \end{matrix} \right\}$	$\left\{ \begin{matrix} 300 \\ 150 \end{matrix} \right\}$	B9A

All types have double cathodes.

§ This is a Special Quality Type.

triode pentodes and double pentode

Type No.	Description	g_m (mA/V)	μ	V_a (V)	V_{g2} (V)	$-V_{g1}$ (V)	I_a (mA)	I_{g2} (mA)	V_h (V)	I_h (mA)	Base
ECF80 (CV5215)	Frequency changer $g_c = 2.1$ mA/V	(T) 5.0 (P) 5.5	20 —	100 250	— 200	2.0 3.2	14 7.0	— 1.8	6.3	430	B9A
PCF802	Triode pentode	(T) 3.5 (P) 5.5	70 —	200 100	— 100	2.0 1.0	3.5 6.0	— 1.7	9.0	300	B9A
ECL86	Triode pentode	(T) 1.6 (P) 10	100 —	250 250	— 250	1.9 7.0	1.2 36	— 6.0	6.3	660	B9A
PCL84	Triode pentode	(T) 4.0 (P) 10.4	65 —	200 200	— 200	1.7 2.9	3.0 18	— 3.0	15	300	B9A
PCL86	Triode pentode	(T) 1.6 (P) 10.5	100 —	230 230	— 230	1.7 5.7	1.2 39	— 6.5	13.3	300	B9A
PCL805/85	Triode pentode	(T) 7.0 (P) 7.25	63 —	100 170	— 170	0 15	10.5 41	— 2.7	17.5	300	B9A
PFL200	Double pentode	(AMP) 8.5 (OUT) 22	— —	150 170	150 170	2.1 2.7	10 30	3.0 7.0	17	300	B10B



Receiving valves

power pentodes book 2 part 1

Type No.	Description	p_a max. (W)	V_a (V)	V_{g2} (V)	$-V_{g1}$ (V)	I_a (mA)	I_{g2} (mA)	g_m (mA/V)	V_h (V)	I_h (mA)	Base
§E810F (CV5809)	High Slope Wideband	5.0a	120	150	1.9	35	5.0	50	6.3	340	B9A
§E55L (CV5808)	High Slope Wideband	10a	125	125	3.0	50	5.5	45	6.3	600	B9D
PL504	Monochrome line output	12 *	75	200	10	440	30	—	27	300	B9D
PL509	Colour Line output	30	160	160	0	1400	45	—	40	300	B9D
PL802	Video output	6.0	170	170	1.3	30	6.5	40	16	300	B9A
a Absolute Maximum Rating.		§ This is a Special Quality Type.					* See published data.				

high voltage diodes

Type No.	Description	P.I.V. max. (kV)	I_a (av) max. (mA)	V_h (V)	I_h (mA)	Base
PY88	Booster diode	6.6	220	30	300	B9A
PY500A	Booster diode	5.6	440	42	300	B9D
DY802	E.H.T. rectifier	25	0.5	1.4	575	B9A

voltage indicator tube

Type No.	Type of Indication	Indicating Condition	V_g (V)	I_a (μ A)	$V_a(b)$ (V)	V_f (V)	I_f (mA)	Base
§DM160 (CV5412) (CV6094)	Fluorescent column	Max. light output Min. light output	0 -3.0	585 <5.0	50	1.0	30	Wired-in
§ This is a Special Quality Type.								

electrometer valves

Type No.	Description	$-I_{g1}$ (A)	g_m (μ A/V)	μ	V_a (V)	V_{g2} (V)	V_{g1} (V)	I_a (μ A)	I_f or I_h (mA)	Base
CV432	Pentode	$<10^{-11}$ $<10^{-11}$	240a 300b	— 20b	45 45	+45a —	-2.0 -2.0	80a 100b	160 (4.5V)	Octal
CV495	Subminiature Triode	$<12.5 \times 10^{-14}$	80	2.0	9.0	—	-2.5	100	13	B5J/F
CV2730	Subminiature Tetrode	$<6.0 \times 10^{-15}$ ($-I_{g2}$)	17	1.2 (g_{2-a})	4.5	-3.2	+3.0	20	13	B5J/F
CV2348	Subminiature Pentode	$<8 \times 10^{-15}$	10.5	110 (g_{1-a})	10	+6.5	-2.5	5.0c	8.2	B5J/F
CV8144	Subminiature Triode with controlled I_a/I_g log characteristic	$<10^{-12}$	80	2.0	9.0	—	-2.7	100	14	B5J/F
a Pentode connected.		b Triode connected.		c $I_{g2} = 2.2 \mu$ A.		† V_f or $V_h = 1.25V$ unless otherwise stated.				



Picture tubes

colour picture tubes book 2 part 1

All Types : Shadow mask. 3-gun. 90° deflection. Compression banded. Push-through presentation. $V_h=6.3V$. $I_h=900mA$. B12-246 base.
Neck diameter 36.5mm.

Type No.	Screen Diagonal		Final Anode Voltage *		Typical Operating Conditions		Light Transmission
	(cm)	(in)	Max. (kV)	Min. (kV)	V_{a1} (V)	$-V_g$ (V)	
A49-120X	49	19	27.5	20	210 to 495	100	4200 to 5000
A56-120X	56	22	27.5	20	210 to 495	100	4200 to 5000
A66-120X	66	26	27.5	20	210 to 495	100	4200 to 5000

* Absolute maximum rating system.

monochrome picture tubes

All Types : 110° deflection. Short unipotential gun. Compression banded. Push-through presentation.

Type No.	Screen Diagonal		Max. Final Anode Voltage (kV)	Typical Operating Conditions			V_h (V)	I_h (mA)	Light Transmission (%)	Neck Diameter (mm)	Base
	(cm)	(in)		V_{a1} (V)	$-V_g$ (V)	Focusing Electrode (V)					
A31-120W	31	12	12	250	35 to 69	0 to +350	11	75	50	20	B7G special
A44-120W/R	44	17	18	400	40 to 77	0 to +400	6.3	300	48	28.6	B8H
A50-120W/R	50	20	20	400	40 to 77	0 to +400	6.3	300	45	28.6	B8H
A61-120W/R	61	24	20	400	40 to 77	0 to +400	6.3	300	42	28.6	B8H

Note : In the type number the suffix /R indicates that a ring trap base is fitted to the tube. Tubes without a ring trap base are available under the same type number but with the suffix omitted.



Electro-optical devices

screen phosphors

On older types of Mullard cathode ray tubes, the colour of the fluorescence and the persistence of the screen phosphor was indicated by the second letter of the type number. On the latest types of Mullard cathode ray tubes, the properties of the screen phosphor are indicated by the second group of letters in accordance with the Pro-Electron system. For example the type number D7-190GH indicates a single trace oscilloscope tube having a 7cm screen with phosphor GH.

The first letter of the second group of letters denotes the colour of the fluorescence (or phosphorescence in the case of long or very long afterglow screens) according to the regions of the Kelly Chart of Colour Designations for Lights, where applicable :

- A — Reddish-purple, purple, bluish-purple.
- B — Purplish-blue, blue, greenish-blue.
- D — Blue-green.

- G — Bluish-green, green, yellowish-green.
- K — Yellow-green.
- L — Orange, orange-pink.
- R — Reddish-orange, red, pink, purplish-pink, purplish-red, red-purple.
- W — White.
- X — Tri-colour screen.
- Y — Greenish-yellow, yellow, yellowish-orange.

The second letter is a serial letter to denote particular phosphors. For the 'standard' television picture tube phosphor the letter 'W' is used without a second letter. The fluorescent colour, phosphorescent colour and persistence of various phosphors can be obtained from the following table :

designation of Mullard phosphors

Present System (Pro-Electron)	Old System	Fluorescent colour	Phosphorescent colour	Persistence	Equivalent JEDEC designation
BA	C	Purplish-blue	—	Very short	—
BC	V	Purplish-blue	—	Killed	—
BD	A	Blue	—	Very short	—
BE	B	Blue	Blue	Medium short	P11
BF	U	Blue	—	Medium short	—
GB	M	Purplish-blue	Yellowish-green	Long	P32
GE	K	Green	Green	Short	P24
GH	H	Green	Green	Medium short	P31
GJ	G	Yellowish-green	Yellowish-green	Medium	P1
GK	G*	Yellowish-green	Yellowish-green	Medium	—
GL	N	Yellowish-green	Yellowish-green	Medium short	P2
GM	P	Purplish-blue	Yellowish-green	Long	P7
GN	J	Blue	Green (Infrared excited)	Medium short (fluorescence)	—
GP	—	Bluish-green	Green	Medium short	P2
GU	—	White	White	Very short	—
KA	—	Yellow-green	Yellow-green	Medium	P20
LA	D	Orange	Orange	Medium	—
LB	E	Orange	Orange	Long	—
LC	F	Orange	Orange	Very long	—
LD	L	Orange	Orange	Very long	P33
W	W	White	—	—	P4
X	X	Tri-colour screen	—	—	P22
YA	Y	Yellowish-orange	Yellowish-orange	Medium	—

*Used in projection tubes.



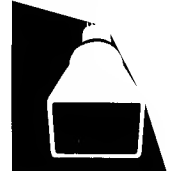
Electro-optical devices

oscilloscope tubes book 2 part 2

Type No.	Description or Application	Screen Dia. (cm) (in)		Deflection Sensitivity (V/cm) S _y S _x		±Max. Final Anode Voltage (kV)	Operation y-plates x-plates		Post Defl. Acc.	†I _h (mA)	Base
DH3-91	Simple oscilloscopes General purpose monitor	3	1	45 (V _{a1} +a ₃ +y''=500V)	53	1.0	Asym.	Sym.	None	300	B8G
D7-190GH	Inexpensive oscilloscopes Monitoring devices	7	3	12 (V _{a1} +a ₃ =1.0kV)	29	2.2	Sym.	Sym.	None	300	Special 14-pin 55566
D^H7-11	Low power consumption Transistor drive	7	3	3.7 (V _{a3} =300V V _{a4} =1.2kV)	10.7	5.0	Sym.	Sym.	Helical	88	Special 14-pin 40467
DG7-31 DG7-32	General purpose monitors	7	3	21.8 (V _{a1} +a ₃ =500V)	37.8	0.8	Sym.	Asym. Sym.	None	300	B12A
D10-160GH	Inexpensive oscilloscopes Read-out devices	10	4	14 (V _{a1} +a ₃ =1.5kV)	33	2.2	Sym.	Sym.	None	300	Special 14-pin 55566
D10-170GH	Short length High sensitivity	10	4	3.5 (V _{a1} +a ₃ =1.0kV V _{a4} =6.0kV)	13.5	6.6	Sym.	Sym.	Yes	300	Special 14-pin 55566
D13-450GH/01	Sectional plates Internal graticule Intended for precision wide-band oscilloscopes between 100 and 250 MHz	13	4½×3½ (Rectangular)	3.0 (V _{a3} =1.5kV V _{a4} =15kV)	9.9	16.5	Sym.	Sym.	Yes	300	Special 14-pin 55566
D13-480GH	Inexpensive oscilloscopes Read-out devices	13	5	15 (V _{a1} +a ₃ =2.0kV)	31	2.2	Sym.	Sym.	None	300	Special 14-pin 55566
D13-500GH/01	Delay-line system of vertical deflection Intended for precision ultra wide-band oscilloscopes	13	5 (Rectangular)	2.0 (V _{s1} =2.5kV V _{a8} =15kV)	15	20	Sym. Helical	Sym.	Yes	300	Special 14-pin 55566
D14-120GH	Short length High sensitivity	14	4½×4 (Rectangular)	4.2 (V _{a1} +a ₃ =1.5kV V _{a4} =10kV)	15.5	11	Sym.	Sym.	Yes	300	Special 14-pin 55566
D14-121GH	As D14-120GH except for side connections to x and y plates	14	4½×4 (Rectangular)	4.2 (V _{a1} +a ₃ =1.5kV V _{a4} =10kV)	15.5	11	Sym.	Sym.	Yes	300	Special 14-pin 55566
D14-160GH/09	High sensitivity medium-band oscilloscopes. Internal graticule with external coil assy. correction	14	4½×4 (Rectangular)	4.2 (V _{a1} +a ₃ =1.5kV V _{a4} =10kV)	15.5	11	Sym.	Sym.	Yes	300	Special 14-pin 55566

† V_h=6.3V.

‡ Absolute ratings.



Electro-optical devices

television monitor tubes book 2 part 2

All Types : Magnetic Deflection. Electrostatic Focusing. Metal-backed Rectangular Screen.

Type No.	Description	Screen diagonal (cm) (in)		Deflection Angle (deg.)	Max. Final Anode Voltage (kV)	Typical V_{a1} (V)	Operating $-V_g$ (V)	Conditions Focusing Electrode (V)	V_h (V)	I_h (mA)	Base
M17-140W	Television viewfinder tube	17	7	70	16	400	32 to 62	0 to +400	6.3	300	B8H
M17-141W	As M17-140W but with reinforced faceplate	17	7	70	18	400	32 to 62	0 to +400	6.3	300	B8H
M24-100W	Precision television studio monitor	24	9½	90	16	600	32 to 85	0 to +400	6.3	300	B8H
M38-120W	Precision television studio monitor	38	15	110	18	400	40 to 85	0 to +400	6.3	300	B8H

data display tubes

Preferred screen variants of the preceding television monitor tube types are available for data display applications.

flying spot scanner tubes

Type No.	Description	Screen Dia. (cm) (in)		Resolution (Lines)	V_a (kV)	$-V_g$ (V)	I_h^\dagger (mA)	Base
Q7-100GU	Primarily for EVR applications. Magnetic deflection, Electrostatic focus	7	3	800	10	35 to 70	300	B8H
Q13-110BA Q13-110GU	Magnetic Tube with metal-backed screen Magnetic Tube for colour television with metal-backed screen	13	5	> 1000	25	50 to 100	300	B12A

$^\dagger V_h = 6.3V.$

projection tubes

Type No.	Description	Fluorescence	Screen Dia. (cm) (in)		V_a (kV)	$I_a(pk)$ (mA)	$-V_g$ (V)	I_h^\dagger (mA)	Base
MG13-38 MU13-38 MW13-38 MY13-38	Projection Tubes with metal-backed screen for high brightness large area displays	Green Blue White Red	13	5	50	2.5	100 to 170	660	B12A

$^\dagger V_h = 6.3V.$



Electro-optical devices

camera tubes book 2 part 2

Type No.	Application	Description	Size (mm)	Focusing	Deflection	Min. Resolution Capability (TV lines)	Length (mm)
XQ1210 XQ1210R XQ1210G XQ1210B	Monochrome Red Image Green Image Blue Image	Miniature *Plumbicon TV pick-up tubes. Separate mesh. Intended for use in compact monochrome and colour broadcast cameras	16.5	Electrostatic	Magnetic	500	136
20PE11	General purpose	Integral mesh vidicon TV pick-up tube for high definition miniature cameras. 95mA heater	17.7	Magnetic	Magnetic	400	108
20PE13	General purpose	Separate mesh vidicon TV pick-up tube for high definition miniature cameras. 95mA heater	17.7	Magnetic	Magnetic	550	108
†XQ1070 XQ1070L XQ1070R XQ1070G XQ1070B	Monochrome Luminance Red Image Green Image Blue Image	*Plumbicon TV pick-up tubes incorporating a separate mesh. Suitable for monochrome and colour broadcast use	25	Magnetic	Magnetic	750	162
†XQ1071 XQ1071R XQ1071G XQ1071B	Monochrome Red Image Green Image Blue Image	*Plumbicon TV pick-up tubes incorporating a separate mesh. Suitable for monochrome and colour industrial use	25	Magnetic	Magnetic	600	162
XQ1080 XQ1080L XQ1080R XQ1080G XQ1080B	Monochrome Luminance Red Image Green Image Blue Image	*Plumbicon TV pick-up tubes. Separate mesh. Anti-comet-tail electron gun for highlight handling and lightpipe for adjustable bias lighting to minimise lag under low-key conditions. Suitable for monochrome and colour broadcast use.	25	Magnetic	Magnetic	750	158
XQ1240 XQ1241	Industrial, medical and broadcast General purpose	Separate mesh vidicon TV pick-up tubes for high definition monochrome and colour use. 95mA heater	25	Magnetic	Magnetic	1000	159
7262A	Industrial and General purpose	Integral mesh vidicon TV pick-up tube for high definition industrial and general purpose cameras. 110mA heater	25	Magnetic	Magnetic	500	130
XQ1020 XQ1020L XQ1020R XQ1020G XQ1020B	Monochrome Luminance Red Image Green Image Blue Image	*Plumbicon TV pick-up tubes incorporating a separate mesh for use at higher beam currents and with dynamic focus. Suitable for monochrome and colour broadcast use	30	Magnetic	Magnetic	600	220
XQ1021 XQ1021R XQ1021G XQ1021B	Monochrome Red Image Green Image Blue Image	*Plumbicon TV pick-up tubes incorporating a separate mesh for use at higher beam currents. Suitable for monochrome and colour industrial use	30	Magnetic	Magnetic	600	220

*Registered trade mark for television camera tubes.

†XQ1070 and XQ1071 series tubes are provided with anti-halation glass discs but are available without the disc under type numbers with a /01 suffix, e.g. XQ1070/01G.



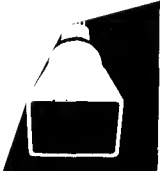
Electro-optical devices

camera tubes (cont.) book 2 part 2

Type No.	Application	Description	Size (mm)	Focusing	Deflection	Min. Resolution Capability (TV lines)	Length (mm)
XQ1023 XQ1023L XQ1023R	Monochrome Luminance Red Image	*Plumbicon TV pick-up tubes incorporating a separate mesh for sensitive high definition monochrome and colour use. Extended red response	30	Magnetic	Magnetic	700	220
XQ1024 XQ1024R	Monochrome Red Image	*Plumbicon TV pick-up tubes incorporating a separate mesh for industrial use. Extended red response	30	Magnetic	Magnetic	700	220
XQ1025 XQ1025L XQ1025R	Monochrome Luminance Red Image	As XQ1023 but incorporating an infrared filter	30	Magnetic	Magnetic	700	220
XQ1026 XQ1026R	Monochrome Red Image	As XQ1024 but incorporating an infrared filter	30	Magnetic	Magnetic	700	220
XQ1220 Series XQ1230 Series	Medical, scientific and low light level TV systems	*Plumbicon TV pick-up tubes. Separate mesh. Anti-comet-tail electron gun. Lightpipe. Fibre optic faceplate for direct coupling to X-ray image intensifiers and light intensifiers with fibre optic windows. XQ1220 series has non-cladded fibre optic XQ1230 series has black-cladded fibre optic.	30	Magnetic	Magnetic	25 lp/mm	210

*Registered trade mark for television camera tubes.

†XQ1070 and XQ1071 series tubes are provided with anti-halation glass discs but are available without the disc under type numbers with a /01 suffix, e.g. XQ1070/01G.



Electro-optical devices

image intensifier tubes book 2 part 2

Type No.	Description	Screen Dia. (mm)	Photocathode	Tube Resolution (line pairs/mm)	Linear Magnification of Image	V _a —k max. (kV)
XX1050	Self-focusing electrostatic image intensifier tube with fibre optic windows having a low background luminance	25	S25	60	0.935	16
XX1060	High gain self-focusing image intensifier assembly for very low light level applications	25	S25	25	0.82 to 1.0	2.85 *
XX1240	Variable gain self-focusing miniature channel image intensifier assembly for compact low light level applications	18	S25	20	0.79	11 †
XX1241	Encapsulated version of XX1240	18	S25	20	0.79	11 †

* V supply (p—p).

† Consisting of 4.75kV cathode to channel plate, a variable voltage 0 to 1.5kV across the channel plate depending on the required gain and 4.75kV channel plate to anode.

image converter tubes

Type No.	Description	Screen Dia. (mm)	Photocathode	Tube Resolution (line pairs/mm)	Linear Magnification of Image	V _a —k max. (kV)
6929	Diode Image Converter sensitive to infrared with electrostatic self-focusing	14.5	Caesium on oxidised silver	50	0.75	12.5

Other image converter tubes, e.g. to specification CV6099, are available.



Photosensitive devices

cadmium sulphide photoconductive cells book 2 part 2

All types : Spectral response range 0.3 to 0.9 μm

Type No.	Incidence of Illumination	Max. Dissipation		Max. Cell Voltage (d.c. or pk.) (V)	Nominal ^a Cell Resistance (k Ω)	Ambient Temperature Limits (°C)	Base
		(mW)	at (°C)				
ORP52	Side-on and End-on	400	25	200	1.2	—40 to +70	Wired-in
ORP60	End-on	70 20	25 70	350	60	—40 to +70	Wired-in
ORP61	Side-on	70 20	25 70	350	60	—40 to +70	Wired-in
ORP62	Side-on	100	25	350	45	—40 to +70	Wired-in
ORP69	Side-on and End-on	100	25	350	30	—40 to +70	Wired-in
ORP90	Side-on	1000 300	25 70	350	1.0	—40 to +70	B7G
ORP93	Side-on	1000 350	25 70	400	1.7	—40 to +70	B7G
RPY18	Side-on	500	25	100	0.5	—40 to +70	Wired-in
RPY19	Side-on	500	25	400	3.0	—40 to +70	Wired-in
RPY20	Side-on	1000	25	400	1.5	—40 to +70	Wired-in
RPY33	End-on (Cadmium sulpho-selenide)	75	25	50	2.5 (at 25 lux)	—40 to +60	Wired-in
RPY43	Side-on	750	25	400	1.5	—40 to +70	Wired-in
RPY54	Side-on	500	25	200	1.5	—40 to +70	Wired-in
RPY55	End-on	1000	25	200	0.42	—40 to +70	Wired-in
RPY58	Side-on (Monograin)	100	40	50	0.6	—40 to +60	Wired-in
RPY71	Side-on (Linear monograin)	50	25	50	3.0 to 6.0 (at 10 lux)	—40 to +70	Wired-in

^a Measured at 50 lux and with lamp of colour temperature 2700K.

Photosensitive devices

photomultipliers book 2 part 2

Type No.	Description	Photocathode Diameter (mm)	Surface	Av. Anode Sensitivity Sensitivity (A/lm)	at V _b (kV)	Cathode Sensitivity (μA/lm)	No. of Stages	Max. Dark Current at Min. Anode Sensitivity (nA)
XP1110	Intended for scintillation counting under limited dimensional conditions	14	Caesium antimony	250	1·8	65	10	100
XP1115	Rugged tube intended for scintillation counting and optical measurements	14	Caesium antimony	250	1·8	65	10	100
XP1116	Rugged construction Suitable for industrial equipment	14	Caesium on oxidised silver	100	1·8	20	10	10 000
XP1117	Rugged construction Suitable for Laser applications	14	Sodium potassium caesium antimony	100	1·8	100	9	100
XP1143	Intended for measurement of very short light pulses of high luminous flux	Useful Area 280mm ²	Caesium antimony	0·45	3·5	45	6	6000 ^a
150AVP	General purpose tube suitable for flying spot scanning, spectrometry and scintillation counting	32	Caesium antimony	700	1·8	70	10	50
150CVP	Tube with S1 photocathode	32	Caesium on oxidised silver	100	1·8	25	10	10 000
XP1010	Low noise Intended for X and γ ray spectrometry	32	Caesium antimony	700	1·8	80	10	50
56AVP	Very high gain and uniform electron transit time	42	Caesium antimony	6500	2·2	65	14	5000 ^b
56DVP	As 56AVP but with high quantum efficiency photocathode	42	Potassium caesium antimony	—	—	45	14	1000 ^b
56TVP	Tube with Trialkali photocathode for use with Laser applications	42	Sodium potassium caesium antimony	11 500	2·5	115	14	5000 ^b
56TUVF	Intended for use where high sensitivity in the visible and ultraviolet region is required	42	Sodium potassium caesium antimony	11 500	2·5	115	14	5000 ^b

^a For gain of 10⁴.

^b For gain of 10⁶.



Photosensitive devices

photomultipliers (cont.) book 2 part 2

Type No.	Description	Photocathode Diameter (mm)	Photocathode Surface	Av. Anode Sensitivity Sensitivity (A/lm)	at V _b (kV)	Cathode Sensitivity (μA/lm)	No. of Stages	Max. Dark Current at Min Anode Sensitivity (nA)
XP1002	Trialkali photocathode for Laser applications	44	Sodium potassium caesium antimony	400	1·8	150	10	50
58AVP	Tube with a very high gain and uniform electron transit time. Curved window surface	110	Caesium antimony	7000	2·4	70	14	12 000 ^b
58DVP	For nuclear physics applications	110	Potassium caesium antimony	—	—	45	14	2000 ^b
57AVP	Tube with an exceptionally large area photocathode surface	200	Caesium antimony	250	1·8	50	11	1000

^a For gain of 10⁴.

^b For gain of 10⁸.

Photosensitive devices

photoemissive tubes book 2 part 2

Type No.	Description	Photocathode		Sensitivity†		Max. Anode Supply Voltage (V)	Max. Cathode Current (μA)	Max. Dark Current (μA)	Max. Dark Current at Anode Supply Voltage (V)		Base
		Projected Area (cm ²)	Surface	(μA/lm)	at (V)						
92AV	Vacuum	2.1	Caesium antimony	45	85	100	25 nA/mm ²	0.05	85		B7G
92AG	Gasfilled	2.1	Caesium antimony	130	85	90	12.5 nA/mm ²	0.1	85		B7G
90CV (CV2134)	Vacuum	3.0	Caesium on oxidised silver	20	50	250	10	0.05	100		B7G
90CG (CV2133)	Gasfilled	3.0	Caesium on oxidised silver	125	90	90	2.0	0.1	90		B7G
90AV (CV2132)	Vacuum	4.0	Caesium antimony	45	100	100	5.0	0.05	100		B7G
90AG (CV2270)	Gasfilled	4.0	Caesium antimony	130	85	90	2.5	0.1	85		B7G
155UG	Gasfilled photoemissive tube with end-on incidence, sensitive to ultraviolet radiation and intended for use as an on-off device in flame failure circuits. Spectral response 0.20 to 0.29 μm										

† Sensitivity measured with the whole cathode area illuminated by a lamp of colour temperature 2700K and with a series resistor 1 MΩ.
 Note : Caesium/antimony cathode is particularly sensitive to daylight and bluish light. Caesium/oxidised silver cathode is particularly sensitive to incandescent light and near infrared radiation.

photoemissive tubes for photometry

Type No.	Photocathode		‡Luminous Sensitivity (μA/lm)		Max. Anode Supply Voltage (V)	Cathode Current per mm ² of the Photocathode (μA/mm ²)	λ at max. Response (μm)	Max. Envelope Temperature (°C)
	Min. Useful dia (mm)	Surface	Typical	Min.				
150CV	26	Caesium on oxidised silver	20	—	100	0.05	0.8	60
150TV	26	Caesium antimony	150	100	100	0.05	0.42±0.03	60
150AV	30	Caesium antimony	60	35	100	0.05	0.42±0.03	60

‡ Measured with a tungsten ribbon lamp having a colour temperature of 2850K.

Cold cathode devices

voltage reference tubes book 2 part 3

Type No.	Description	Maintaining Voltage (V)	Preferred Cathode Current (mA)	Max. Incremental Resistance (Ω)	Max. Voltage Jumps (mV)	V min. for Ignition (V)	Base
ZZ1000	Subminiature	80.1 to 81.9	3.0	—	—	120	Flying Lead
83A1	High performance	83 to 84.5	4.5	350	1.0	130	B7G
85A2 (CV449) §M8098 (CV4048)	Voltage reference	83 to 87	6.0	450	50	115	B7G

§ This is a Special Quality Type.

voltage stabiliser tubes

Type No.	Description	Nominal Maintaining Voltage (V)	Burning Current Max. (mA)	Min.	Max. Regulation Voltage (V)	V min. for Ignition (V)	Base
75C1 §M8225 (CV4080)	Close tolerance	78	60	2.0	8.0	115 110	B7G
90C1 (CV5173)	Close tolerance	90	40	1.0	14	115	B7G
108C1 (CV1833) §M8224 (CV4028)	Low regulation voltage	108	30	5.0	3.5	133 130	B7G
150B2 (CV2225) §M8163 (CV4104)	Close tolerance	150	15	5.0	5.0	180	B7G
150C2 (CV1832)	General purpose	150	30	5.0	6.0	185	B7G
150C4 §M8223 (CV4020)	Close tolerance	150	30	5.0	5.0	185 165	B7G

§ This is a Special Quality Type.

switching diodes

Type No.	Description	Ignition Voltage (V)	Maintaining Voltage (V)	Extinction Voltage (V)	I _k (mA)	Base
ZA1002	Neon filled subminiature switching diode with a large and stable difference between ignition and maintaining voltage	170	109	—	3.5	Flying Lead
ZA1004	Neon filled subminiature switching diode for use with control voltages $\geq 6V$	90	—	83.5	1.0	Flying Lead



Cold Cathode devices

indicating tubes book 2 part 3

Type No.	Description	Characters Displayed	Character Height (mm)	Minimum Supply Voltage (V)	Main-taining Voltage (V)	Recom-mended Cathode Current (mA)	Base
ZM1000 ZM1000R	In line, side-viewing indication As ZM1000 but with red filter	Numbers 0-9	14	170	—	2.5	Special 14-pin
ZM1001 ZM1001R	In line, side-viewing indication As ZM1001 but with red filter	Characters +, —, ~, X, Y, Z	10 to 14	170	—	2.5	Special 14-pin
ZM1020 ZM1022	In line, end-viewing indication Incorporates a red filter As ZM1020 but without red filter	Numbers 0-9	15.5	170	140	2.0	B13B
ZM1021 ZM1023	In line, end-viewing indication Incorporates a red filter As ZM1021 but without red filter	Characters A, V, Ω, +, —, %, ~	15.5	170	140	2.0	B13B
ZM1080 ZM1082	In line, side-viewing indication Incorporates a red filter As ZM1080 but without red filter	Numbers 0-9	13	170	140	2.0	Flying Lead
ZM1081 ZM1083	In line, side-viewing indication Incorporates a red filter As ZM1081 but without red filter	Characters —, +, ~	10.5	170	140	2.0	Flying Lead
			± 2-05	> 7 ± 1-93	> 15 ± 1-82		
ZM1162	In line, end-viewing indication Rectangular envelope	Numbers 0-9	15.5	170	140	2.5	Rectangular 14-pin
ZM1163	In line, end-viewing indication Rectangular envelope	Characters —, +, ~, ×	15.5	170	140	2.5	Rectangular 14-pin
ZM1164	In line, end-viewing indication Rectangular envelope	Numbers 0-9 with decimal point on left hand	15.5	170	140	2.5	Rectangular 14-pin
ZM1174 ZM1175	In line, side-viewing indication Incorporates a red filter As ZM1174 but without red filter	Numbers 0-9 with decimal point on left hand	15.5	170	140	2.5	Flying Lead
ZM1176 ZM1177	In line, side-viewing indication Incorporates a red filter As ZM1176 but without red filter	Numbers 0-9 with decimal point on right hand	15.5	170	140	2.5	Flying Lead
ZM1235	In line, side-viewing indication Inverted version of ZM1170 (leads mounted at top)	Numbers 0-9	15.5	170	140	10 to 18mA peak	Flying Lead
ZM1237	In line, side-viewing indication (leads mounted at top)	Characters 1/2, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8	15.5	170	140	10 to 18mA peak	Flying Lead
ZM1251	Flat pack, alpha-numeric construction dot matrix	7 × 5 dot matrix with 2 decimal points	9.8	220	145	2mA peak per dot	Special flat lead
ZM1263	In line, side-viewing indication Incorporates a red filter	Characters —, +, ~, *	10.5	170	140	2.5	Flying Lead

* This is a symbol shaped like a Catherine-wheel on type ZM1263 that may be used for special indications, e.g. fault condition.



Cold cathode devices

Pandicon* multiple indicator tubes book 2 part 3

Type No.	Description	Characters Displayed	Character Dimensions (mm)	Minimum Supply Voltage (V)	Anode Current (mA)	Base
ZM1200	Multiple numerical indicator tube 14 decades	Numbers 0-9, decimal point, punctuation mark	height 10 pitch 10	170 peak	9.0 peak	2 × special 17-pin
ZM1206	Multiple numerical indicator tube 8 decades	Numbers 0-9, decimal point, punctuation mark	height 10 pitch 10	170 peak	7.5 peak	2 × special 17-pin
ZM1400 series	Flat multiple segmented indicator tube 5 to 17 displays with or without symbol	7-segment characters, decimal point, symbol	height 8 pitch 9	140	6.0 peak max.	flat leads

* Registered trade mark for multiple indicator tubes.

Drive Module: A dynamic drive module type DDM14 is available for Pandicon tube types ZM1200 and ZM1206 or up to 14 single indicator tubes.

counting tubes

All types : End-viewing. Self indicating						
Type No.	Description	Max. Stepping Speed (kHz)	Supply Voltage (V)	Output Voltage (V)	Output Current (μA)	Base
Z504S ZM1070	Cold cathode gas-filled decade tube with cathodes 0-9 brought out separately, for use as a counter or selector	5.0	475	35	340	B13B
Z505S ZM1060	Similar to Z504S but capable of operating at higher speeds	50	475	24	800	B13B

trigger tubes

Type No.	Description	Nominal Trigger Ignition Voltage (V)	Anode Supply Voltage (V)	Anode Maintaining Voltage (V)	I _k (av) max. (mA)	Base
Z900T (CV5122)	Triode suitable for stand-by operation on 117V a.c. supply	80	175	62	35	B7G
Z803U (CV2434)	Close tolerance tube with stable characteristics intended for d.c. operation	132	240	105	40	B9A



Power devices

ignitrons for welding applications book 2 part 3

Type No.	Description	Single Phase Control (Welder Duty) ^a			Three Phase Welder Service		Ignitor Requirements	
		Max. Demand (kVA)	Max. Average Current (A)	*Max. Averaging Time (s)	Max. <i>v_a</i> (pk) (V)	Max. <i>i_a</i> (pk) (A)	<i>v_{ign}</i> (pk) (V)	<i>i_{ign}</i> (pk) (A)
ZX1051	Water-cooled Ignitrons primarily intended for resistance welding and similar a.c. control applications. Thermostats can be mounted to provide protection against overheating or to economise in the water-flow	200 600	56 30·2	11·8 11·8	1200 1500	600 480	150	12
ZX1052		400 1200	140 75·6	9·4 9·4	— —	— —	150	12
ZX1053		800 2400	355 192	7·3 7·3	600 1500	4000 2400	150	12
ZX1061	Up rated 'B' size tube with physical dimensions as ZX1051. Low arc voltage	400 1200	70 38	15·8 15·8	— —	— —	150	12
ZX1062	Up rated 'C' size tube with physical dimensions as ZX1052. Low arc voltage	760 2280	180 110	13·8 13·8	— —	— —	150	12

^a Two tubes connected in inverse parallel on 600V supply. * At 380V r.m.s.

inert gas thyratrons

Type No.	Description	<i>I_k</i> (av) max. (A)	Max. Peak Anode Voltage (kV)		<i>V_f</i> or <i>V_h</i> (V)	<i>I_f</i> or <i>I_h</i> (A)	Base
			Forward	Inverse			
EN92 (CV3512)	Tetrode	0·025	0·5	0·5	6·3	0·15	B7G
EN91 (CV797) §M8204 (CV4018)	Tetrode	0·1	0·65	1·3	6·3	0·6	B7G
EN32 (CV2253)	Tetrode	0·3	0·65	1·3	6·3	0·95	Octal
ZT1011 XR1-1600A } (CV5234)	Triode	2·5	1·5	1·5	2·5	8·5	B4G
†XR1-3200A	Triode	3·2	1·5	1·5	2·5	12	B4D
†XR1-6400A	Triode	6·4	1·5	1·5	2·5	21	B4D

† Suffix A to thyatron type numbers indicates the disc seal development of the standard tube. Electrical characteristics are identical.
§ This is a Special Quality Type.



Power devices

high voltage half-wave rectifiers book 2 part 3

Type No.	Description	D.C.† Output (A)	P.I.V. max. (kV)	Ik (av) max. (A)	Full Load† (kV)	Vf (V)	If (A)	Base
RG1-240A (CV1072) (CV1626) (CV2738)	Mercury-vapour	0.5	6.5	0.25	2.0	4.0	2.7	British 4-pin
RG3-250 (CV1625)	Mercury-vapour	0.5	10	0.25	3.1	2.5	5.0	Medium Edison Screw
RG3-250A (CV32)	Mercury-vapour	0.5	10	0.25	3.1	2.5	5.0	B4G
RR3-250 (CV1835)	Inert gas	0.5 1.0	10 5.0	0.25 0.5	3.1 1.5	2.5	5.0	B4G
RG3-1250 (CV1629)	Mercury-vapour	2.5	8.0 _a 13 _b	1.25	4.1	4.0	7.0	Goliath Edison Screw
RR3-1250 (CV2518)	Inert gas	2.5	10	1.25	3.1	5.0	7.0	B4F
RR3-1250A (CV2399)	Inert gas	2.5	13	1.25	4.1	4.0	11	Goliath Edison Screw
RR3-1250B	Inert gas	2.5	13	1.25	4.1	4.0	7.0	Goliath Edison Screw
RG4-1250 (CV1435)	Mercury-vapour	2.5	10 _a 20 _b	1.25	6.3	4.0	11	Goliath Edison Screw
RG4-3000	Mercury-vapour	6.0	15 _a	3.0	4.8	5.0	11.5	B4D

† Two tubes in a single phase full-wave circuit.
a At condensed mercury temperature 25 to 55°C.
b At condensed mercury temperature 20 to 40°C.

mercury vapour triode thyratrons

Type No.	Ik(av) max. (A)	Max. Peak Anode Voltage (kV)		†Ih (A)	Base
		Forward	Inverse		
XG1-2500 (CV5027)	2.5	1.0	1.5	4.5	B4G
XG2-6400	6.4	2.5	2.5	10	B4D

† Vh=5.0V.



Transmitting tubes triodes for industrial heating book 2 part 4

ceramic/metal construction range of high efficiency external anode power triodes

Type No.	Cooling	Approx. Output at Full Ratings (kW)	Max. Frequency at Full Ratings (MHz)	Max. Frequency at Reduced Ratings (MHz)	p_a Max. (kW)	V_a Max. (kV)	I_k Max. (A)	V_f (V)	I_f (A)	Base
YD1240 YD1244	Forced-air Forced-air	2.7	250	—	1.5	5.5	1.4	6.3	33	Coaxial
YD1150 YD1152	Forced-air Water (helix)	4.5	160	220	2.5	7.2	1.4	6.3	33	Coaxial
YD1160 YD1161 YD1162	Forced-air Water (separate jacket) Water (helix)	8.8	120	220	5.0	7.2	2.8	6.3	66	Coaxial
YD1173	Forced-air	13.2	50	—	10	12	2.5	5.4	65	Coaxial
YD1170 YD1171 YD1172	Forced-air Water (separate jacket) Water (helix)	15.4	120	—	10	7.2	4.8	5.8	130	Coaxial
YD1180 YD1182	Forced-air Water (integral jacket)	30	100	—	15 20	9.0	7.5	7.0	175	Coaxial
YD1190 YD1192 YD1193	Forced-air Water (integral jacket) Vapour cooled	60	30	—	30 40 40	9.6	14.5	8.4	235	Coaxial
YD1202 YD1203	Water (integral jacket) Vapour cooled	120	30	—	80	14.0	24	12.3	255	Coaxial
YD1212 YD1213	Water (integral jacket) Vapour cooled	240	30	—	120	16.8	34	12.6	380	Coaxial
YD1342	Water (integral jacket)	480	30	—	240	19.2	55	14	555	Coaxial



Transmitting tubes

triodes for industrial heating (cont.) book 2 part 4

Type No.	Description	Approx. Output at Full Ratings (kW)	Max. Frequency at Full Ratings (MHz)	Max. Frequency at Reduced Ratings (MHz)	pa Max. (kW)	Va Max. (kV)	Ik Max. (A)	Vf or Vh (V)	If or Ih (A)	Base
TY2-125 (CV1924)	R.F. Power Triode for general purpose industrial heating applications	0.39	150	200	0.135	2.5	0.25	6.3	5.4	B5F
TY4-400	Radiation cooled Triode for pre-heating and plastic welding and induction heating equipment	1.3	100	—	0.4	4.0	0.48	5.0	14	B5F
TY5-500	Radiation cooled Triode for general purpose industrial heating applications	1.5	50	—	0.5	5.0	0.77	5.0	32.5	4-pin Special
TY4-500	Radiation cooled Triode for general purpose industrial heating applications	1.69	100	120	0.45	4.0	0.65	10	9.9	B5K
TY6-800	Radiation cooled Triode for general purpose industrial heating applications	2.7	50	—	0.8	6.0	1.05	6.3	32.5	4-pin Special
TY6-1250A	External anode Power Triode for general purpose industrial heating applications	4.1	50	—	2.1	7.0	2.3	6.3	65	—
TY8-6000A TY8-6000W TY8-6000H	External anode Power Triodes for general purpose industrial heating applications	7.2	50	—	6.0	8.0	2.5	12.6	33	—
TY7-6000A (CV5239) TY7-6000W TY7-6000H	External anode Power Triodes for general purpose industrial heating applications	8.25	55	85	6.0	7.2	2.8	12.6	33	—
TY8-15A TY8-15H	External anode Power Triodes for general purpose industrial heating applications	14.3	30	—	10 15	8.0	5.0	6.3	130	—

Suffixes A, W and H to the type number indicate forced-air cooled, water cooled and water cooled (integral helix) respectively.



Transmitting tubes

s.s.b. tetrodes book 2 part 4

Type No.	P.E.P. Output (W)	f max. (MHz)	V _a (V)	Two Tone Operation V _{g2} (V)	I _a (mA)	d3 (dB)	V _f or V _h (V)	I _f or I _h (A)	Base
QV06-20	46	175	600	200	72	30	6·3	1·25	Octal
YL1150	120	60	600	250	221	30	6·3	2·5	B7A
YL1070	141	60	1000	250	131	30	6·3	1·8	B7A
QV08-100 QV08-100B } YL1290	220	30	750	310	270	28	6·3 19	3·9 2·3	B5F
QV2-250C } 4CX250B	300	175	2000	350	190	28	6·0	2·6	B8F
QY4-250 (CV2131)	510	120	4000	550	128	36	5·0	14·1	B5F
QY4-400 } (CV5959)	650	110	4000	705	175	34	5·0	14·5	B5F
YL1110	680	1215	2500	450	350	31	6·3	7·85	Coaxial
QY5-500	900	75	5000	700	200	28	10·0	9·0	B5K
QY5-3000A } (CV5219) QY5-3000W	1380	200	5000	1000	576	42	6·3	32·5	—

Suffixes A and W indicate forced-air cooled and water cooled respectively.



Transmitting tubes

telecommunications power tetrodes book 2 part 4

Type No.	Description	Approx. Output at Full Ratings (W)	Max. Frequency at Full Ratings (MHz)	Max. Frequency at Reduced Ratings (MHz)	pa Max. (W)	Va Max. (V)	Vg2 Max. (V)	Ik Max. (mA)	Vf or Vh (V)	If or Ih (A)	Base
QV03-12 (CV2129)	Natural cooling	10	30	175	12	300	250	70	6.0	0.75	B9A
QV06-20 QV06-20B QV06-20C	Natural cooling	52	60	175	20	600	250	160	6.3 12.6(B) 26.5(C)	1.25 0.625 0.3	Octal Octal Octal
YL1150	Radiation cooled	150	60	—	75	750	300	360	6.3	2.6	B7A
QV08-100 QV08-100B YL1290 }	Radiation cooled	200	30	—	100	825	300	450	6.3 19	3.9 2.3	B5F
QY3-65 (CV1905) (CV6122)	Radiation cooled	280	50	250	65	3 000	400	230	6.0	3.5	B7A
QY3-125 (CV2130)	Radiation cooled	375	120	200	125	3 000	400	300	5.0	6.5	B5F
QV2-250C } 4CX250B }	External anode Forced-air cooled	390	500	—	250	2 000	300	250a	6.0	2.6	B8F
YL1110	External anode Forced-air cooled Ceramic/metal	800	400	1 215	700	2 500	1 200	650	6.3	7.85	Coaxial
QY4-500A	External anode Forced-air cooled	930	110	220	500	4 000	500	440	5.0	13.5	Special
QY4-250 (CV2131)	Forced-air cooled	1 000	75	120	250	4 000	600	420	5.0	14.1	B5F
QY4-400 (CV5959)	Forced-air cooled	1 100	110	—	400	4 000	600	420	5.0	14.5	B5F
QY5-500	Radiation cooled	1 760	75	110	500	5 000	700	600	10	9.9	B5K
YL1440	Forced-air cooled Ceramic/metal	2 250	250	—	1 500	4 000	600	1 200	4.2	55	Coaxial
QY5-3000A } (CV5219) } QY5-300W }	Forced-air cooled Water cooled	4 100	75	220	3 000	5 000	800	1 300	6.3	32.5	Special
YL1470	Forced-air cooled Ceramic/metal	5 700	110	—	6 000	7 000	1 000	4 500	6.3	120	Coaxial
YL1420	Forced-air cooled Ceramic/metal	6 300	250	—	6 000	6 000	1 000	4 500	6.3	120	Coaxial
YL1430	Forced-air cooled Ceramic/metal	13 000	250	—	12 000	8 000	1 000	8 500	8.0	120	Coaxial
YL1520	External anode Forced-air cooled Ceramic/metal	27 500	250	—	18 000	9 000	1 000	9 000	11.5	120	Coaxial

a la max.



Transmitting tubes

double tetrodes book 2 part 4

Type No.	Approx. Output at Full Ratings (W)	Max. Frequency at Full Ratings (MHz)	Max. Frequency at Reduced Ratings (MHz)	pa max. (W)	Va max. (V)	Vg2 max. (V)	Ik max. (mA)	Vh (V)	Ih (A)	Base
QQV02-6 (CV2466)	5·8	500	—	2×3·0	250	200	2×45a	6·3 12·6	0·6 0·3	B9A
QQV03-10 (CV2798)	16	100	225	2×5·0	300	200	2×50	6·3 12·6	0·83 0·42	B9A
YL1240	22	200	—	2×7·5	400	200	2×48	6·75 13·5	0·76 0·38	Novar
QQV03-20A (CV2799)	48	200	600	2×10	600	300	2×55	6·3 12·6	1·3 0·65	B7A
QQV03-25	67	200	600	2×12·5	750	300	2×66	6·3 12·6	1·3 0·65	B7A
QQV06-40A (CV2797)	90	200	500	2×20	600	300	2×120	6·3 12·6	1·8 0·9	B7A
QQV07-50 (CV5847)	103	200	500	2×25	750	300	2×150	6·3 12·6	1·8 0·9	B7A

a Ia max.

triodes for television translator service

Type No.	Description	Typical Power Output (W)	Output At Frequency (MHz)	Max. Frequency (GHz)	pa max. (W)	Va max. (kV)	Ia max. (mA)	Intermodulation Product (dB)
YD1300 YD1301	Amplifier	35 50	780	1·0	300	1·8	200	—52
YD1330	Amplifier	220	860	1·0	1800	3·5	700	—52
YD1332	Amplifier	220	860	1·0	1800	3·5	700	—52
YD1333	Amplifier	100	860	1·0	900	3·5	550	—56



Transmitting tubes

telecommunications power triodes book 2 part 4

Type No.	Approx. Output at Full Ratings (kW)	Max. Frequency at Full Ratings (MHz)	Max. Frequency at Reduced Ratings (MHz)	pa max. (kW)	Va max. (kV)	Ik max. (A)	Vf or Vh (V)	If or Ih (A)	Base
YD1331	0.25	1000	—	0.9	3.5	0.55	6.3	5.4	Coaxial
TY2-125 (CV1924)	0.39	150	200	0.135	2.5	0.25	6.3	5.4	B5F
TY4-400	1.2	100	—	0.35	4.0	0.49	5.0	14	B5F
TY4-500	1.69	100	120	0.45	4.0	0.65	10	9.9	B5K
TY6-5000A } (CV3926) TY6-5000W TY6-5000H	6.9	75	220	5.0 6.0 6.0	6.0	1.85	12.6	33	—
TY7-6000A } (CV5239) TY7-6000W TY7-6000H	10	30	—	6.0	7.2	2.8	12.6	33	—
TY8-15A TY8-15H	17.7	30	—	10 15	8.0	5.5	6.3	130	—
TY12-15A	41	30	—	15	13	5.8	8.0	130	—

Suffixes A, W and H to power triode type numbers indicate forced-air, water cooled and water cooled (integral helix) respectively.



Microwave tubes

heating magnetrons book 2 part 5

Type No.	Description	P _{out} (kW)	Frequency (GHz)	V _a (kV)	I _a (A)	V _h (starting) (V)	I _h (A)
7090	Generator for microwave therapy	0.2	2.45±0.025	1.65	0.2	5.3	3.3
YJ1420	Microwave Generator for domestic applications	0.95	2.45±0.025	4.0	0.34	3.1	13.5
DX206	Fast warm-up Microwave Generator for cooking	1.0	2.45±0.025	5.6	0.38	4.0	30
YJ1280	Fast warm-up Microwave Generator for cooking	1.2	2.45±0.025	5.7	0.38	5.0	30
YJ1371	Microwave Generator for cooking	1.2	2.45±0.025	3.5	0.6	12	3.0
YJ1160	Water cooled Microwave Generator for industrial processing and cooking	2.5	2.45±0.025	4.6	0.75	5.0	32
YJ1162	As YJ1160 except forced-air cooled						
YJ1191	Water cooled Microwave Generator for industrial processing	5.0	2.45±0.025	7.1	1.25	5.5	46

low power tunable magnetrons

Type No.	Description	Frequency Band	P _{out} (pulse) (kW)	Frequency (GHz)	V _a (pulse) (kV)	I _a (pulse) (A)	Duty Factor	Pulse Duration (μs)	V _h (starting) (V)	I _h (A)
YJ1030 (CV6225)	Miniature	C	0.12	5.4 to 5.9	1.18	0.8	0.002	3.0	5.0	0.5
YJ1410 (CV6248)	Miniature	C	1.0	5.2 to 5.6	2.8	1.5	0.002	1.0	5.0	0.72
JPT9-01 (CV2420)	C.W.	X	0.01 *	9.15 to 9.6	0.92 *	0.05 *	—	—	6.3	1.2
JPT9-01D (CV8269)		X	0.01	9.05 to 9.6	0.9	0.06	0.05	5.0	6.3	1.2
JPT9-02E (CV6114)	Low stray radiation field	X	0.017	9.15 to 9.5	1.0	0.14	0.05	5.0	6.3	1.2
JPT9-02 (CV2421)		X	0.025	9.15 to 9.6	1.0	0.12	0.05	5.0	6.3	1.2
JPG9-02C (CV5443)	Low stray radiation field	X	0.025	9.15 to 9.55	1.02	0.14	0.05	5.0	6.3	1.2
YJ1090 (CV6214) }	Rugged miniature	X	0.05	9.0 to 9.5	1.18	0.9	0.004	2.0	5.0	0.5
YJ1100	Rugged miniature	X	0.18	9.0 to 9.5	1.18	0.9	0.004	1.0	5.0	0.5

*C. W. operation. D.C. supply.

All types are packaged.

T in type number indicates thimble tuning mechanism.

G in type number indicates geared tuning mechanism.



Microwave tubes

high power radar magnetrons book 2 part 5

Type No.	Description	Fre- quency Band	Pout(pulse) (kW)	Frequency (GHz)	Va(pulse) (kV)	Ia(pulse) (A)	Duty Factor	Pulse Duration (μs)	Vh (starting) (V)	Ih (A)
5J26 (CV3602) }	Tunable Unpackaged Forced-air cooled	L	610	1.22 to 1.35	27.2	46	0.002	6.0	23.5	2.2
YJ1150	Tunable Unpackaged Forced-air cooled	L	1000	1.25 to 1.35	30	97	0.001	3.0	23.5	2.2
5586	Tunable Unpackaged Forced-air cooled	S	800	2.7 to 2.9	28	70	0.0005	1.0	16	3.0
JP9-180 (CV2373) }	Fixed frequency Forced-air cooled	X	180	9.375±0.05	20.5	22.5	0.0005	2.0	12.6	2.25
4J50 (CV2284) }	Fixed frequency Forced-air cooled	X	250	9.375±0.03	21.5	27.5	0.001	6.0	13.75	3.25
4J78 (CV3953) }				9.086±0.083						
JP9-250B (CV2426) }				8.913±0.083						
JP9-250C (CV2427) }				8.93±0.065						
JP9-250D (CV2425) }				8.748±0.083						
JP9-250E (CV2424) }				8.583±0.083						
JP9-250F (CV2473) }				9.24±0.03						

All types are packaged unless otherwise stated.

spin tuned magnetrons

Type No.	Description	Fre- quency Band	Pout(pulse) (kW)	Frequency (GHz)	Va(pulse) (kV)	Ia(pulse) (A)	Duty Factor	Pulse Duration (μs)	Vh (starting) (V)	Ih (A)
YJ1180	Spin tuned over 450 MHz sweep in 500 μs	X	205	8.7 to 9.5	22.5	27.5	0.0011	1.5	13.75	3.15
YJ1181	With optional frequency lock			8.7 to 9.5						
YJ1182	With optional frequency lock			9.25 to 9.5						
YJ1320	Spin tuned over 670 MHz sweep in 500 μs	J	60	15.9 to 17.1	15.5	15	0.0005	1.0	12.6	1.0
YJ1321	With optional frequency lock			15.9 to 17.1						

All types are packaged.



Microwave tubes

marine radar magnetrons book 2 part 5

Type No.	Description	Fre- quency Band	Pout (pulse) (kW)	Frequency (GHz)	Va (pulse) (kV)	Ia (pulse) (A)	Duty Factor	Pulse Duration (μs)	Vh (starting) (V)	Ih (A)
JP9-2-5 JP9-2-5C JP9-2-5D JP9-2-5E } (CV10758) JP9-2-5H JP9-2-5L YJ1000	Fixed frequency	X	3.0	9.41±0.065 9.550±0.03 9.445±0.03 9.445±0.03 9.375±0.03 9.445±0.03 9.255±0.065	3.6	3.0	0.0005	0.5	6.3	0.5
YJ1300	Fixed frequency	X	7.0	9.41±0.03	4.3	5.0	0.001	1.0	6.3	0.55
2J42 } (CV3676) JP9-7A } (CV370)	Fixed frequency Forced-air cooled	X	10	9.375±0.03 9.24±0.03	5.5 5.5	4.5 4.5	0.0025 0.0025	2.5 1.0	6.3 6.3	0.6 0.6
JP9-7D } (CV1866) JP9-7L JP9-7T	Fixed frequency Forced-air cooled	X	10	9.375±0.03	5.7 5.5 5.7	5.5 4.5 5.5	0.001 0.001 0.001	1.0 1.0 1.0	6.3 6.3 6.3	0.6 0.6 0.6
YJ1071	Fixed frequency	X	10	9.41±0.03	5.8	6.0	0.001	1.0	6.3	0.55
YJ1110	Fixed frequency	X	20	9.375±0.03	7.8	7.5	0.001	1.5	6.3	0.55
JP9-15 } (CV3997) JP9-15B } JP9-15D } (CV5123)	Fixed frequency	X	21	9.375±0.03 9.445±0.03 9.375±0.03	7.5	7.5	0.001	2.5	6.3	0.55
JP9-18	Fixed frequency	X	21	9.41±0.03	7.2	8.6	0.001	2.5	6.3	0.55
JP9-22B JP9-22D JP9-22L JP9-22R YJ1120 YJ1121 YJ1123 YJ1124	Fixed frequency	X	25 25 25 25 25 26 26 26	9.49±0.03 9.17±0.03 9.475±0.025 9.24±0.03 9.41±0.03 9.445±0.03 9.445±0.015 —0.03 9.65±0.03	8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3	8.0 8.0 9.0 9.0 9.0 9.0 9.0 9.0	0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3	0.55 0.55 0.55 0.55 0.55 0.55 0.55 0.55
JP9-50A	Fixed frequency Forced-air cooled	X	50	9.375±0.03	12.5	12	0.001	1.0	6.3	1.0
725A } (CV722)	Unpackaged	X	50	9.375±0.03	12	12	0.001	2.5	6.3	1.0

All types are packaged unless otherwise stated.



Microwave tubes

marine radar magnetrons (cont.) book 2 part 5

Type No.	Description	Frequency Band	P _{out} (pulse) (kW)	Frequency (GHz)	V _a (pulse) (kV)	I _a (pulse) (A)	Duty Factor	Pulse Duration (μs)	V _h (starting) (V)	I _h (A)
2J51A (CV5134) }	Tunable Forced-air cooled	X	60	8.5 to 9.6	13.5	14	0.0012	3.6	6.3	1.0
YJ1290	Fixed frequency Forced-air cooled	X	65	9.445±0.03	14	14	0.001	1.0	6.3	1.0
JP9-75	Fixed frequency Forced-air cooled	X	80	9.375±0.03	15	15	0.001	1.0	10	2.85
4J52A (CV5018) }	Fixed frequency Forced-air cooled	X	80	9.375±0.03	15	15	0.001	5.0	12.6	2.2
YJ1140	Fixed frequency Forced-air cooled	J	45	16.5±0.15	12.5	15	0.002	0.5	12.6	3.0
YJ1020 YJ1021	Fixed frequency Forced-air cooled	Q	25 30	33.05±0.35 33.05±0.35	12.5 12.5	10.5 12.5	0.0003 0.0003	0.05 0.5	4.0 4.0	3.4 3.4
7093	Fixed frequency Forced-air cooled	Q	30	34.512 to 35.208	12.5	12.5	0.0003	0.3	5.0	3.8

All types are packaged.

beacon and special purpose magnetrons

Type No.	Description	Frequency Band	P _{out} (pulse) (kW)	Frequency (GHz)	V _a (pulse) (kV)	I _a (pulse) (A)	Duty Factor	Pulse Duration (μs)	V _h (starting) (V)	I _h (A)
JPT9-01M	Push rod tuning mechanism Low stray radiation field	X	0.015	9.3 to 9.5	1.0	0.10	0.25	50	6.3	1.2
JP8-02B (CV6072) }	Fixed frequency	X	0.025	8.8±0.03	0.8	0.15	0.2	4.0	6.3	1.2
YJ1380 (CV6234) }	Rugged version	X	0.025	8.8±0.03 -0.015	0.8	0.15	0.2	4.0	6.3	1.6
YJ1010 (CV8652) } YJ1011	Tunable Forced-air cooled Tunable calibration facility	X	225	8.50 to 9.60	21.5	27.5	0.001	2.75	13.75	3.1

All types are packaged.



Microwave tubes

airborne radar magnetrons book 2 part 5

Type No.	Description	Fre- quency Band	P _{out} (pulse) (kW)	Frequency (GHz)	V _a (pulse) (kV)	I _a (pulse) (A)	Duty Factor	Pulse Duration (μs)	V _h (starting) (V)	I _h (A)
6521	Fixed frequency	C	85	5.38 to 5.42	15	13.5	0.001	2.2	10	3.2
YJ1070 (CV6108)	Fixed frequency	X	10	8.80±0.03	5.5	4.5	0.0025	2.5	6.3	0.5
YJ1040 (CV8505)	Fixed frequency	X	15	9.375±0.03	6.7	5.25	0.0015	2.5	6.3	0.55
YJ1112	Fixed frequency High altitude	X	20	9.375±0.03	7.8	7.5	0.0015	1.5	6.3	0.55
YJ1060	Fixed frequency High altitude	X	20	9.375±0.03	7.2	7.5	0.002	2.5	6.3	0.55
YJ1050 (CV6199)	Fixed frequency	X	22	9.24±0.03	7.5	7.5	0.001	1.0	6.3	0.55
YJ1200 (CV9424)	Fixed frequency	X	45	9.375±0.03	12.4	12	0.0025	5.0	12.6	2.2
YJ1201	High altitude			9.375±0.03						
2J55	Fixed frequency Forced-air cooled	X	50	9.375±0.03	12.5	12	0.001	2.5	6.3	1.0
YJ1250	Fixed frequency Rugged	X	90	9.345±0.03	15.2	17.5	0.0015	7.0	12.6	2.2
YJ1430	Fixed frequency	J	10	16.4 to 16.6	9.0	5.25	0.0006	0.25	12.6	0.62

All types are packaged.

radar travelling wave tubes

Type No.	Description	Fre- quency Band	Min. Power Output (sat.) (W)	Frequency Range (GHz)	Noise Factor (dB)	Typical Operation as Amplifier				Mount Type No.
						Power Gain (dB)	Helix Voltage (kV)	Collector Voltage (kV)	Collector Current (mA)	
LB3-250B (CV6223)	Broadband pulsed power Amplifier	S	250	2.7 to 3.3	—	32	†	†	800	S3L1
YH1060 (CV6183)	Broadband low power Amplifier	X	0.002	9.0 to 10	8	25	1.2	1.3	0.4	Packaged
LA9-3B (CV6087)	Broadband low power Amplifier	X	0.001	7.0 to 11.5	22	30	1.3	1.4	0.55	Packaged

† Peak Pulse Cathode Voltage= —5.0kV, other electrodes grounded.



Microwave tubes

communications travelling wave tubes book 2 part 5

Type No.	Description	Frequency Band	Min. Power Output (sat.) (W)	Frequency Range (GHz)	Noise Factor (dB)	Typical Operation as Amplifier				Mount Type No.
						Power Gain (dB)	Helix Voltage (kV)	Collector Voltage (kV)	Collector Current (mA)	
YH1210	U.H.F. TV transposer amplifier	U.H.F.	200	0.47 to 0.86	—	30	3.5	3.5	850	55380
YH1090	Telecommunications power Amplifier	4GHz	25	3.4 to 4.2	24	42	2.2	1.3	60	55329 or 55332
YH1170	Telecommunications power Amplifier	C	22	5.8 to 8.5	27	39	2.8	1.3	55	55337
LB6-10	Telecommunications power Amplifier	C	10	5.9 to 6.5	25	35	2.65	1.7	40	P6L4
LB6-25	Telecommunications power Amplifier	C	25	5.9 to 6.5	28	38	3.4	2.2	45	P6L11
LB6-25A	Telecommunications power Amplifier	6GHz	20	6.4 to 7.2	28	38	3.5	2.2	45	P6L11A
LB7-20E	Telecommunications power Amplifier	7GHz	18	7.1 to 7.8	28	38	3.4	2.0	40	P6L12



Microwave tubes

low power klystrons book 2 part 5

Type No.	Description	Frequency Band	P _{out} (W)	Mechanical Frequency Range (GHz)	Electronic Tuning Range (MHz)	V _{resonator} (kV)	V _{reflector} (—V)	I _h (A)
<i>p67</i> <i>p67.5</i> <i>E</i> KS7-85 (CV5900) }	Mechanically-tuned Coaxial output probe	7GHz	0.1	6.5 to 7.5	38	0.3	70 to 205	0.5
KS7-85A		7GHz	0.045	6.5 to 7.5	35	0.3	70 to 205	0.5
KS7-85B		7GHz	0.09	7.2 to 7.8	35	0.3	110 to 230	0.5
<i>p67</i> <i>E</i> 723A/B (CV1795) }	Mechanically-tuned Coaxial output probe	X	0.025	8.7 to 9.55	40	0.3	90 to 200	0.5
2K25 (CV2792) }		X	0.035	8.5 to 9.6	40	0.3	85 to 200	0.5
KS9-20B (CV9334) }		X	0.030	9.32 to 9.5	40	0.3	135 to 175	0.5
KS9-20D		X	0.025	9.3 to 9.615	40	0.3	125 to 190	0.5
<i>p42.3</i> <i>E</i> KS9-40	Mechanically-tuned Waveguide output	X	0.04	9.3 to 9.5	40	0.3	65 to 115	0.5
KS9-40B		X	0.035	9.35 to 9.55	40	0.3	60 to 115	0.5
KS9-40D		X	0.035	9.38 to 9.51	40	0.3	70 to 120	0.5
KS9-40G		X	0.035	9.35 to 9.55	40	0.3	60 to 115	0.5
<i>p79.20</i> <i>E</i> YK1046 (CV6195)	Mechanically-tuned Light-weight Waveguide output	X	0.03	9.16 to 9.34	30	0.275	75 to 100	0.5
<i>p234</i> <i>E</i> YK1090	Rugged. Mechanically-tuned Flying leads. Waveguide output	X	0.4	10.5 to 12.2	35	0.4	60 to 110	1.2
<i>p79.20</i> <i>E</i> YK1091	Mechanically-tuned. 3-pin base. Waveguide output	X	0.4	10.5 to 12.2	35	0.4	60 to 110	1.2
55335	Mechanically-tuned Micrometer tuning Waveguide output	Q	0.1	31 to 36	60	2.25	100 to 500	1.02 max.
<i>p1278</i> <i>E</i> YK1010	Mechanically-tuned Micrometer tuning Waveguide output Forced-air cooled	O	0.1	67 to 73	100	2.5	20 to 500	1.7 (3.5V)

† V_h = 6.3V unless otherwise stated.



Microwave tubes

u.h.f. high power klystrons — c.w. operation book 2 part 5

Type No.	Description	Power Output (kW)	Frequency Range (MHz)	Cooling	Focusing System	Beam Voltage (kV)	Collector Voltage (kV)	Beam Current (A)
YK1001 YK1002	Multi-cavity Amplifiers	11	470 to 860	Air Air and Water	Permanent magnet	18.5	13.5	1.9
YK1000 YK1004	Multi-cavity Amplifiers	11	400 to 620 610 to 790	Water	Electromagnet	19	19	1.9
YK1005	Multi-cavity Amplifier	11	470 to 860	Air	Permanent magnet	20	16	2.0
YK1150 * YK1151	Multi-cavity Amplifiers	23	470 to 860	Air	Permanent magnet	20 to 23	4	3.5 to 3.1
YK1191	Multi-cavity Amplifier	45	590 to 720	Water	Electromagnet	21.5	21.5	6.2

* Includes trolley.

S-band high power klystrons — pulse operation

Type No.	Description	Power Output (kW)	Frequency Range (MHz)	Cooling	Focusing System	Beam Voltage (kV)	Collector Voltage (kV)	Beam Current (A)
YK1110	Pulsed Multi-cavity Amplifier	6000 *	2993 to 3003	Water	Electromagnet	210 *	210 *	100 *
YK1200	Pulsed Multi-cavity Amplifier	25 000	2993 to 3003	Water	Electromagnet	280 *	280 *	250 *

* Peak values. Pulse duration 2.2 μs. Pulse repetition rate 50 pulse/s.



Microwave solid state germanium tunnel diodes book 1 part 3

Type No.	Description	Cut-off Frequency fr min (GHz)	Ip typ mA	Ip/Iv min	Noise Measure Ns
AEY13	Low noise microwave amplifier in S band	6.0	2.0	6.0	1.3
AEY15		8.0			
AEY16		10			

microwave mixer diodes

Type No.	Description	Maximum Operating Frequency (GHz)	Typical Noise Figure (dB)	Leakage Current at VR=0.5V (μA)	Forward Current at VF=0.5V (mA)	Typical Impedance zif (Ω)	Operating Temperature (°C)
BAW95D BAW95E BAW95F BAW95G	Schottky barrier diode for use in X band	12	7.8 7.2 6.8 6.3	—	—	300	—65 to +150
CAY17	Schottky barrier diode for use in X band	12	6.0	1.0 at 5.0V	0.05 at 0.6V	300	—55 to +150
AAV50 (CV7838) AAV50R* (CV7839)	Germanium diode for use in X band	12	6.2	3.0	9.0	400	—55 to +100
BAV22 BAV22R*	Coaxial Schottky barrier diodes for use in S and X band low noise mixers	12	6.0	—	—	400	—55 to +150
AAV51 (CV7776) AAV51R* (CV7777)	Germanium diode for use in J band	18	7.0	3.0	9.0	270	—55 to +100
AAV52 AAV52R*	Germanium diode for use in J band	18	8.0	3.0	9.0	270	—55 to +100
AAV39 (CV7762) AAV39A	Germanium sub-miniature diode for use in X band	18	6.0 7.0	3.0	5.0	350	—65 to +150
AAV34	Germanium sub-miniature diodes for use in Q band	40	8.5	10	2.0	750	—65 to +150
AAV59		40	8.5	2.0	2.0	1000	—55 to +100

* Reverse polarity version.

Type No.	Max. Op. Frequency (GHz)	Operating Bands	Typical Noise Factor (dB)	Typical I.F. Impedance (Ω)
SIM2 (CV2154) SIM5* (CV2155)	12	X, S, L	9.5	350
GEM1* GEM2	12	X	7.5	170
GEM3 (CV7108) GEM4* (CV7109)	12	X, S, L	8.5	350

* Reverse polarity version.



Microwave solid state microwave detector diodes book 1 part 3

Type No.	Description	Frequency Range (GHz)	Typical Tangential Sensitivity (dbm)	Min. Figure of Merit	Typical Video Impedance (Ω)
BAV46	Schottky barrier diode for use in X band doppler radar systems	1 to 12	—52	—	850
CAY17	Schottky barrier diode for use at X band	1 to 12	—50 *	—	220
BAV75	Schottky barrier diode for low level detector applications	1 to 18	—52	—	—
AEY17	Germanium bonded backward diode for use at X band	1 to 18	—53	120 *	300
AEY31 AEY31A	Subminiature germanium bonded backward diode for use up to J band	1 to 18 1 to 18	—53 —50	120 * 50 *	300 300
AEY29	Germanium bonded backward diode for use at J band	12 to 18	—53	50†	300

* Measured at 9.375 GHz.

† Measured at 16.5 GHz in JAN 201 holder.

varactor diodes

Type No.	Description	Capacitance at V _R (pF)	V _R (V)	V _R max. (V)	Typical C _j (pF)	Typical Cut-off Frequency (GHz)
BAY96	Silicon planar diode for use in high efficiency multiplier circuits, input powers up to 30W	16 35	40 6	120	32	25
BXY27	Silicon planar epitaxial varactor diode for use in multipliers up to S band and input powers up to 10W	4.5	6	55	4.5	70
BXY28	Silicon planar epitaxial varactor diode for use in high efficiency multipliers in the 2 to 4 GHz range	1.5	6	45	1.5	100 min.
BXY29	Silicon planar epitaxial varactor diode for use in frequency multiplier circuits in the 4 to 8 GHz range	1.0	6	25	1.0	120
BXY32	Silicon planar step recovery diode for high order frequency multipliers with outputs in X band	0.75	6	—	0.75	150
BXY35	Silicon planar epitaxial varactor diodes for frequency multipliers up to 18 GHz, available in a variety of outlines	9	6	100	9	25
BXY36		5	6	70	5	75
BXY37		3	6	70	3	100
BXY38		1.6	6	50	1.6	120
BXY39		1.0	6	40	1.0	150
BXY40		0.65	6	25	0.65	180
BXY41		0.4	6	25	0.4	200
CAY10	Gallium arsenide diode, diffused mesa type, for use in microwave parametric amplifiers, frequency multipliers and switches	0.4	0	6	0.4	250
CXY10	Gallium arsenide diode with a high cut-off frequency for use in parametric amplifiers, frequency multipliers and switches	0.2	0	6	0.2	400
CXY12	Gallium arsenide diode with a high cut-off frequency for use in frequency multipliers up to Q band	0.25	6	10	0.25	500
1N4885	Silicon varactor diode for use in high efficiency multiplier circuits	35	6	150	35	25
1N5152	Silicon planar epitaxial varactor diodes for use in multipliers up to S band	6	6	75	6	100
1N5153		6	6	75	6	100
1N5155	Silicon planar epitaxial varactor diode for use in multipliers up to C band	2	6	35	2	120
1N5157	Silicon planar epitaxial varactor diode for use in multipliers up to X band	0.8	6	20	0.8	200



Microwave solid state gunn effect devices book 1 part 3

Type No.	Description	Operating Voltage (V)	Operating Frequency	P _{out} (typ.) (mW)	P _{tot} Max. (25°C) (W)
CXY11A CXY11B CXY11C	Ga As bulk effect devices employing the Gunn Effect to produce C.W. oscillations at microwave frequency	7.0	X Band	5 10 15	1.0
CXY19 CXY20		8 to 15	X Band	65 65	3.0 3.0
CXY14A CXY14B CXY14C		6.0	J Band	5 10 15	1.0

solid state sources book 2 part 5

Type No.	Description	Nominal Centre Frequency (GHz)	P _{out} (mW)	Minimum Mechanical Tuning Range (MHz)	Typical Electronic Tuning Range (MHz)	Output Coupling
CL8360 CL8370 CL8380 CL8390	Gunn Effect Oscillators Mechanically Tuned	8.5	5	±500	—	50 Ω O.S.M.
		9.5	5	±500	—	50 Ω O.S.M.
		10.5	5	±500	—	50 Ω O.S.M.
		11.5	5	±500	—	50 Ω O.S.M.
CL8460 CL8470	Gunn Effect Oscillators Mechanically and Electronically Tuned	9.35	10	±150	—	50 Ω O.S.M.
		9.35	10	±150	—	WG16/WR90
CL8300 CL8310	Gunn Effect Oscillators Mechanically and Electronically Tuned	9.4	3	±50	200	50 Ω O.S.M.
		9.4	3	±50	200	WG16/WR90
CL8430 CL8450	Gunn Effect Oscillators Mechanically and Electronically Tuned	9.35	5	±150	50	50 Ω O.S.M.
		9.35	5	±150	50	WG16/WR90
CL8630	Fixed frequency Gunn Effect oscillator for miniature radar systems	10.69	8	—	—	WG16/WR90
CL8441	Temperature compensated Gunn Effect oscillator to replace the klystron in marine radars. Electronically Tuned	9.4	5	±100	60	WG16/WR90

NOTE : All the oscillators described here require a negative 7V stabilised power supply, with the exception of the CL8441 (—7.5V).
The electronically tunable oscillators require a tuning voltage of up to 10V negative.

mixers

Type No.	Description	Frequency Band	Frequency Range (GHz)	Terminals
CL7330 CL7331 CL7332	Miniature thin film balanced mixers using Schottky barrier diodes	X	9.0 to 10.0	50 Ω O.S.M.
		X	10.7 to 11.7	50 Ω O.S.M.
		X	11.7 to 12.7	50 Ω O.S.M.



Microwave solid state parametric amplifiers book 2 part 5

Type No.	Description	Frequency Band	Noise Figure (dB)	Bandwidth (MHz)	Tuning Range (GHz)
CL9010	Single diode parametric amplifier with pump klystron	S	3.0	15	2.7 to 3.1
CL9011	As CL9010 but with waveguide terminals	S	3.0	15	2.7 to 3.1
CL9012	As CL9010 but packaged in temperature stabilised box	S	3.0	15	2.7 to 3.1
CL9070	Packaged parametric amplifier in temperature stabilised box	L	2.5	15	1.09

ferrite components—circulators and isolators

Mullard offer a comprehensive range of circulators and isolators. Examples from this range are shown below and further miniature circulators are available with octave bandwidths

Type No.	Frequency Range (MHz)	Max. Insertion Loss (dB)	Min. Isolation (dB)	v.s.w.r.	C.W. Power Rating (W)	Coaxial Terminals	Waveguide Flange Type
Coaxial circulators (frequency range 170 to 4200 MHz)							
CL5191	170 to 200	0.4	20	1.2	500	Type N	—
CL5251	470 to 590	0.35	22	1.2	100	Type N	—
CL5171	590 to 720	0.35	22	1.2	100	Type N	—
CL5181	710 to 860	0.35	22	1.2	100	Type N	—
Waveguide circulators (frequency range 3400 MHz, 3 port, to 13 500 MHz, 4 port)							
CL5091	6175 to 6425	0.1	30 opp. ports 20 adj. ports	1.05	150	—	IEC-UER70
Coaxial isolators (frequency range 740 to 3900 MHz)							
CL6001	740 to 810	0.3	22	1.2	100	Type N	—
Waveguide isolators (frequency range 3650 to 13 500 MHz)							
CL6201	3800 to 4200	0.8	30	1.05	10	—	IEC-UER48
CL6251	6425 to 7150	0.3	30	1.05	20	—	IEC-UER70



Particle & radiation detectors

channel electron multipliers book 2 part 2

Type No.	Description	Max. Operating Voltage (kV)	Output	Nominal Resistance (Ω)	Nominal Gain	[†] Nominal Background Pulse Count Rate (pulse/s)	[‡] Pulse Height Distribution Resolution
B410AL B410BL	Planar spiral tube of internal diameter 2.2mm	3.5	Open-ended Closed	3×10^9	1.5×10^8 at 2.5kV	0.1 at 2.5kV	0.5
B419AL B419BL	Planar spiral tube of internal diameter 2.2mm with effective aperture of 9mm	3.5	Open-ended Closed	3×10^9	1.7×10^8 at 2.5kV	0.25 at 2.5kV	0.5
B310AL B310BL	Planar spiral tube of internal diameter 1.25mm	4.0	Open-ended Closed	3×10^9	1.3×10^8 at 3kV	0.1 at 3kV	0.5
B312AL B312BL	Planar spiral tube of internal diameter 1.25mm with effective aperture of 2×8 mm	4.0	Open-ended Closed	3×10^9	1.3×10^8 at 3kV	0.2 at 3kV	0.5
B318AL B318BL	Planar spiral tube of internal diameter 1.25mm with effective aperture of 4mm	4.0	Open-ended Closed	3×10^9	1.3×10^8 at 3kV	0.25 at 3kV	0.5
B330AL B330BL	C-shaped tube of internal diameter 1.25mm	4.0	Open-ended Closed	3×10^9	1.5×10^8 at 2.5kV	0.1 at 3kV	0.5

[†] Above an equivalent threshold of 2×10^7 electrons. [‡] At a modal gain of 10^8 and 1000 pulse/s.

channel electron multiplier plates

Type No.	Description	Channel Diameter (μm)	Diameter of Disc (mm)	Thickness of Disc (mm)	Current Gain at 1kV	Max. Current Output at 1kV (μA)	Resistance (Ω)	Channel Pitch (μm)
G40-25	An array of channel electron multipliers fused into the shape of a disc	40	27.1	1.6	1000	1.0	approx. 10^8	50
G40-50		40	53	1.6	1000	10	approx. 10^7	50

Note : Special shapes are available on application.



Particle & radiation detectors

End window beta G-M tubes book 2 part 2

Type No.	Window Diameter (mm)	Window Thickness (mg/cm ²)	Recommended Working Voltage (V)	Max.* Background (counts/min)	Dead Time (approx.) (μs)
MX147	9	2 to 3	500	10	90
MX168	17	2.5 to 3	420	24	100
MX148	19.8	1.5 to 2	575	15	175
MX123	24.1	1.5 to 2.5	600	25	60
MX149	27.8	2.5 to 3.5	575	25	190
MX167	51	3.5 to 4	900	30	45

*Shielded with 50mm lead and 3mm aluminium.

gamma sensitive G-M tubes

Type No.	Gamma Sensitivity (counts/min)	Recommended Working Voltage (V)	Max.* Background (counts/min)	Dead Time (approx.) (μs)
MX146	1 400†	500	45	90
MX180	2 200‡	425	60	100
MX120/01	6 800‡	420	90	200
MX145	13 000‡	420	160	200

* Unshielded.

† At 1.0mR/h ⁶⁰Co gamma radiation.

‡ At 1.0mR/h Radium source.

thin wall beta gamma G-M tubes

Type No.	Gamma Sensitivity at 1.0mR/h (counts/min)	Wall Thickness (mean) (mg/cm ²)	Recommended Working Voltage (V)	Max.* Background (counts/min)	Dead Time (approx.) (μs)
MX172	5400†	50	420	55	90
MX177	4400‡	50	625	30	70
MX178	8800‡	50	625	60	100

* Shielded with 50mm lead and 3mm aluminium.

† Radium source.

‡ ⁶⁰Co gamma radiation.



Particle & radiation detectors high current G-M tubes book 2 part 2

Type No.	Gamma Sensitivity at 10mR/h ⁶⁰ Co source (counts/min)	Wall Thickness (mg/cm ²)	Recommended Working Voltage (V)	Max.* Background (counts/min)	Dead Time (approx.) (μs)
MX163	250	80 to 100	550	1	11
MX151	1200	80 to 100	575	2	15
MX119	5700	400	600	20	35
MX164	6000	32 to 40	575	12	45

* Shielded with 50mm lead and 3mm aluminium.

liquid sample G-M tube

Type No.	Liquid Capacity (ml)	Wall Thickness (mg/cm ²)	Recommended Working Voltage (V)	Max.* Background (counts/min)	Dead Time (approx.) (μs)
MX124/01	9 to 10	30	450	50	100

* Shielded with 50mm lead and 3mm aluminium.

x-ray sensitive G-M tube

Type No.	Efficiency	Recommended Working Voltage (V)	Max.* Background (counts/min)	Dead Time (approx.) (μs)
MX118	Efficiency is over 50% for wavelengths between 0.12 and 0.25nm (1.2 to 2.5Å)	1250	50	150

* Shielded with 50mm lead and 3mm aluminium.

low background & guard G-M tubes

Type No.	Description	Window Diameter (mm)	(1)	Max. Background (counts/min)	(2)	Dead Time (approx.) (μs)
MX152	End window	19.8	1.2	5		65
MX166	End window	27.8	2	9		60
MX155	Guard	—	—	—		1000

(1) At 600V shielded with 100mm iron outside 30mm lead in anticoincidence circuit with guard tube MX155.

(2) At 600V shielded with 100mm iron outside 30mm lead.



Vacuum products

ionisation gauges book 2 part 2

Type No.	Description	Tubulation †	Pressure Range (torr)	Gauge Factor	Max. Bake-out Temperature (°C)
EIP-12	Evaporation ion pump incorporating Bayard-Alpert gauge	W	10^{-3} to 10^{-10}	12	450
IOG-12	Single filament Bayard-Alpert gauge	K	10^{-3} to 10^{-10}	12	450
IOG-12W/UKG2	Wide bore tubulation version of IOG-12	K	10^{-3} to 10^{-10}	12	450
IOG-13T	Nude version of IOG-12	M	10^{-3} to 10^{-10}	12	450
IOG-17	Bayard-Alpert gauge with one tungsten and one lanthanum hexaboride filament	W	10^{-3} to 10^{-10}	12	450
IOG-18	Fine-wire collector Bayard-Alpert gauge	K	10^{-3} to 4×10^{-11}	12	450
IOG-18N	Nude version of IOG-18	M	10^{-3} to 4×10^{-11}	12	450
IOG-20N	Modulated Bayard-Alpert gauge (nude)	M	10^{-3} to 10^{-12}	23	450
IOG-71	Ionisation gauge	W	10^{-3} to 5×10^{-8}	20	450

† K = "Kovar" type sealing glass.

W = Tungsten sealing glass.

M = "Kovar" type metal skirt.

appendage vacuum pumps

Type No.	Description	Tubulation †	Pumping Speed * (l/s)	Pressure Range (torr)
EIP-12	Evaporation ion pump	W	0.4	10^{-3} to $<10^{-11}$
VKP-1	Magnetron 'K' pump	S	1.2	10^{-2} to 10^{-10}
VKP-1K	Magnetron 'K' pump	K	1.2	10^{-2} to 10^{-10}
VKP-1P	Magnetron 'K' pump	W	1.2	10^{-2} to 10^{-10}

† K = "Kovar" type sealing glass.

W = Tungsten sealing glass.

S = Stainless steel.

* See data sheets for details.

Dry reed switch book 2 part 3

Type No.	Description	Switched Voltage (V)	Switched Current (mA)	Switched Power (W)	Contacts	Maximum Dimensions (mm)
RI-12	Dry reed switch capsule primarily designed for telephone exchanges Type approved to P.O. specification T4547A	50	100	5.0	Normally open	3.97 diameter 28.3 length 46.1 overall length including leads

MULLARD CIRCULATORS

<u>No.</u>	<u>Frequency</u>	<u>Isolate</u>	<u>Loss</u>	<u>Weight</u>
CL 5007	470-600 MHz	20dB	0.6 dB	2Kg
CL 5008	590-720 MHz	20dB	0.6 dB	2Kg
CL 5010	710-860 MHz	20dB	0.6 dB	2Kg
CL 5029	710-860 MHz	22dB	0.35dB	2Kg
CL 5191	170-200 MHz	20dB	0.4 dB	6.4Kg



Mullard Limited
Mullard House
Torrington Place
London WC1E 7HD
Tel: 01-580 6633

Mullard Industrial Distributor Service



Birmingham 021-236 5060: Gothic Electronic Components Ltd., Beacon House, Hampton St., Birm. 19
Birmingham 021-359 4301: Hawnt & Company Ltd., 112/114 Pritchett Street, Birmingham B6 4EN
Bristol 294313: Wirelect Electronics Ltd., 'Wirelect House', 122/123 St. Thomas Street, Bristol BS1 6JW
Crawley 28700: SASCO Ltd., P.O. Box 2000, Gatwick Road, Crawley, Sussex
Glasgow 041-445 3347/3991: Harper Robertson Electronics Ltd., 82 Loanbank Quadrant, Glas. S.W.1
Leeds 636311: Farnell Electronic Components Ltd., Canal Road, Leeds LS12 2TU
Leicester 768561: Townsend-Coates Ltd., Coleman Road, Leicester LE5 4LP
London 01-237 0404/8: Edmundsons Electronics Ltd., Cowley House, 30-50, Ossory Road, London, S.E.1
Rochdale 47411: Swift Hardman Ltd., P.O. Box 23, Hardale House, Baillie Street, Rochdale
Sheffield 27161: Needham Engineering Co. Ltd., P.O. Box 23, Hill Street, Sheffield S2 4SZ